

**CALIFORNIA ENVIRONMENTAL QUALITY ACT  
NOTICE OF DETERMINATION**

CONTRA COSTA COUNTY DEPARTMENT OF CONSERVATION AND DEVELOPMENT  
651 PINE STREET NORTH WING, 4TH FLOOR MARTINEZ, CALIFORNIA 94553-0095

Contact Person: Claudia Gemberling, Environmental Analyst II

Telephone: (925) 313-2192

**Project Title:** Upper and Lower Sand Creek Basin Expansion Project (WO#: 7589-6D8518)

**Project Location:** Upper Sand Creek Basin is located approximately 1,500 east of Deer Valley Road in Antioch; Lower Sand Creek Basin is located on the north side of Sand Creek Road in Brentwood, approximately ¼ mile east of the Highway 4 Bypass in east Contra Costa County

**County File #:** CP# 09-52

**Project Description:** Contra Costa County Flood Control and Water Conservation District (Flood Control District) proposes to expand the interim flood control basins in the lower Marsh Creek watershed to attenuate flows from the upper Marsh Creek watershed, which will help provide flood protection for surrounding and downstream communities. The operation of the LSCB is contingent upon the USCB operating to meter peak flows.

The USCB will be the first of the two basins to be expanded. The project will expand the approximate 41-acre basin to approximately 62 acres, increasing its flood storage capacity from 123-acre feet to 900-acre feet (35-foot maximum depth). The expansion will consist of excavating the basin floor to create a deeper basin where water will be held and slowly released downstream during major storm events. The basin will have multiple levels of excavation. Excavation depths will range from 0 to approximately 37 feet below existing grade, resulting in proposed basin elevations ranging from 158 feet above mean sea level in the lowest tier of the basin floor to 195 feet at the basin's perimeter. The basin expansion extends south of Sand Creek. The lowest (southern) tier will include Sand Creek; approximately 3,876 feet of Sand Creek will be excavated 10 feet below its current elevation of which approximately 3,612 feet will be reconstructed with a fluvial geomorphic (natural creek) design to restore and enhance Sand Creek within the basin; the remaining 264 feet will be re-created on-site as wetland acreage. Construction is planned to begin spring 2011 and be completed by October 2011.

Following the USCB expansion, the LSCB portion of the project will expand the approximate 19-acre interim basin to approximately 23 acres, increasing its flood storage capacity from 40-acre feet to 300-acre feet (22-foot maximum depth). The expansion will consist of excavating the basin floor to create a deeper basin where water will be held slowly and released downstream during major storm events. Similar to USCB, the basin will have multiple levels of excavation. Excavation depths will range from 4 to 23.5 feet below existing grade resulting in basin elevations ranging from 88 feet above mean sea level in the lowest tier of the basin floor to 110 feet at the basin's perimeter. The basin expansion extends north of Sand Creek. The lowest (northern) tier will include Sand Creek; approximately 1,100 feet of Sand Creek will be excavated and reconstructed with a wetland mitigation area within the expanded basin. Construction is anticipated for 2016 and will take approximately 6 months to complete.

No traffic impacts are anticipated as construction of the basins will occur off-road. Traffic measures will be in place to minimize traffic impacts from construction-related vehicles and trucks leaving and entering the project sites.

Real property transactions including, but not limited to, property acquisitions and construction easements, will be required.

The project is located within the East Contra Costa County Habitat Conservation Plan (HCP) inventory area. Therefore, in addition to on-site mitigation, the District will pay fees to the HCP Conservancy. In addition, avoidance and minimization measures will be implemented prior to and during construction to prevent direct and indirect impacts to special-status species as well as other species that occur in the area.

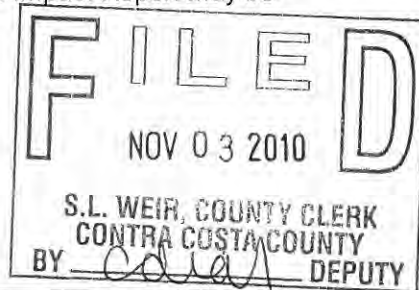
The project was approved on \_\_\_\_\_.

Pursuant to the provisions of the California Environmental Quality Act:

- ☐ An Environmental Impact Report was prepared and filed with the State Clearinghouse (# \_\_\_\_\_).
- ☐ The Project was encompassed by an Environmental Impact Report previously prepared for \_\_\_\_\_ (SCH# \_\_\_\_\_).
- ☒ A (Mitigated) Negative Declaration was prepared.

Copies of the record of project approval and the Negative Declaration or the final Environmental Impact Report may be examined at the office of the Contra Costa County Public Works Department.

- ☐ The Project will not have a significant environmental effect.
- ☐ The Project will have a significant environmental effect.
- ☒ Mitigation measures were made a condition of approval of the project.
- ☐ A mitigation reporting or monitoring plan was adopted for this project.
- ☐ A statement of Overriding Considerations was adopted.
- ☐ Findings were adopted pursuant to Section 15091 of the State CEQA Guidelines.



Date: 9/9/10

By: [signature]  
Conservation and Development Department Representative

**AFFIDAVIT OF FILING AND POSTING**

I declare that on NOV 03 2010 I received and posted this notice as required by California Public Resources Code Section 21152(c). Said notice will remain posted for 30 days from the filing date.

[signature]  
Signature

DEPUTY COUNTY CLERK  
Title

**Applicant:**

Public Works Department

255 Glacier Drive

Martinez, CA 94553

Attn: Claudia Gemberling  
Environmental Section

**Department of Fish and Game Fees Due**

☐ EIR - \$2,768.25

☒ Neg. Dec. - \$2,010.25

☐ DeMinimis Findings - \$0

☒ County Clerk - \$50

☒ Community Development Dept. - \$25

**Total Due: \$** \_\_\_\_\_

Total Paid \$ \_\_\_\_\_

Receipt #: \_\_\_\_\_



State of California—The Resources Agency  
DEPARTMENT OF FISH AND GAME  
2010 ENVIRONMENTAL FILING FEE CASH RECEIPT

RECEIPT# 397319  
STATE CLEARING HOUSE # (If applicable)

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY

LEAD AGENCY CONTRA COSTA COUNTY DEPT OF CONS. & DEV		DATE 11-3-10
COUNTY/STATE AGENCY OF FILING CCC Clerk-MTZ		DOCUMENT NUMBER 10-434
PROJECT TITLE UPPER AND LOWER SAND CREEK BASIN EXPANSION PROJECT ETC		
PROJECT APPLICANT NAME CONTRA COSTA COUNTY DEPT OF CONS & DEV		PHONE NUMBER 925 813 2192
PROJECT APPLICANT ADDRESS 651 PINE ST, 4TH FLOOR	CITY MARTINEZ	STATE CA
		ZIP CODE 94553

PROJECT APPLICANT (Check appropriate box):

☒ Local Public Agency ☐ School District ☐ Other Special District ☐ State Agency ☐ Private Entity

CHECK APPLICABLE FEES:

<input type="checkbox"/> Environmental Impact Report (EIR)	\$2,792.25	\$
<input checked="" type="checkbox"/> Mitigated/Negative Declaration (ND)(MND)	\$2,010.25	\$ 2010.25
<input type="checkbox"/> Application Fee Water Diversion (State Water Resources Control Board Only)	\$850.00	\$
<input type="checkbox"/> Projects Subject to Certified Regulatory Programs (CRP)	\$949.50	\$
<input checked="" type="checkbox"/> County Administrative Fee	\$50.00	\$ 50.00
<input type="checkbox"/> Project that is exempt from fees		
<input type="checkbox"/> Notice of Exemption		
<input type="checkbox"/> DFG No Effect Determination (Form Attached)		
<input type="checkbox"/> Other		

PAYMENT METHOD:

☐ Cash ☐ Credit ☐ Check ☒ Other JV # 1535 & 1615

TOTAL RECEIVED \$ 2060.25

SIGNATURE

X [Signature]

TITLE

DEPUTY COUNTY CLERK

WHITE - PROJECT APPLICANT

YELLOW - DFG/ASB

PINK - LEAD AGENCY

GOLDEN ROD - COUNTY CLERK

FG 753.5a (Rev. 11/09)

# INITIAL STUDY/MITIGATED NEGATIVE DECLARATION



## UPPER AND LOWER SAND CREEK BASIN EXPANSION PROJECT

ANTIOCH AND BRENTWOOD, CONTRA COSTA COUNTY

Contra Costa County Flood Control and Water Conservation District  
255 Glacier Drive  
Martinez, CA 94553



Project No.: 7589-6D8518  
CP# 09-52

SEPTEMBER 2010

**CALIFORNIA ENVIRONMENTAL QUALITY ACT  
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION**

[Pursuant to Public Resources Code Section 21080(c) and California Code of Regulations, Title 14, Sections 15070-15071]

In compliance with the California Environmental Quality Act (CEQA) (California Public Resources Code, Section 21000, et seq.), this Initial Study has been prepared to determine whether an Environmental Impact Report (EIR) or a Negative Declaration needs to be prepared, or to identify the significant environmental effects to be analyzed in an EIR.

**PROJECT TITLE**

Upper and Lower Sand Creek Basin Expansion Project

**LEAD AGENCY NAME AND ADDRESS**

Contra Costa County Department of Conservation and Development  
651 Pine Street, North Wing – 4<sup>th</sup> Floor  
Martinez, California 94553

**CONTACT PERSON AND PHONE NUMBER**

Claudia Gemberling (925) 313-2192  
Environmental Analyst II  
Contra Costa County Public Works Department

**PROJECT LOCATION**

The Upper Sand Creek Basin (USCB) is located in Antioch, approximately 1,500 feet east of Deer Valley Road.

The Lower Sand Creek Basin (LSCB) is located in Brentwood north of Sand Creek Road and west of Fairview Avenue, east of the Highway 4 Bypass.

**PROJECT SPONSOR'S NAME AND ADDRESS**

Contra Costa County Flood Control and Water Conservation District  
255 Glacier Drive  
Martinez, California 94553

**GENERAL PLAN AND ZONING DESIGNATIONS**

**Upper Sand Creek Basin:**

Contra Costa County: Public/Semi-Public (Contra Costa County 2005a)  
City of Antioch: Public Facility (City of Antioch 2003a)

**Lower Sand Creek Basin:**

Contra Costa County: Public/Semi-Public (Contra Costa County 2005a)  
City of Brentwood – Public Facility (City of Brentwood 2009a)

Contra Costa County Flood Control and Water Conservation District (Flood Control District) proposes to expand the interim flood control basins in the lower Marsh Creek watershed to attenuate flows from the upper Marsh Creek watershed, which will help provide flood protection for surrounding and downstream communities. The operation of the LSCB is contingent upon the USCB operating to meter peak flows.

## **BACKGROUND AND PURPOSE**

Historically, the land use in the watershed has been predominantly cattle ranching and farming. Since the early 1990s, the cities of Antioch and Brentwood have rapidly urbanized with a large increase of residential and commercial developments. The Flood Control District is collaborating with the cities on infrastructure needs associated with urbanization to improve flood protection for the residents and businesses in this part of the County (Contra Costa County Flood Control and Water Conservation District [Flood Control District] 2008).

In 1990, the Contra Costa County Board of Supervisors, in their capacity as Directors of the Flood Control District, approved an Environmental Impact Report (EIR) that analyzed the environmental effects of establishing five (5) drainage areas in the Marsh Creek watershed, along with associated drainage improvements. In 1992, the Flood Control District developed the Marsh Creek Watershed Plan in order to address the deficiency of flood storage capacity in Marsh Creek. The funding mechanism to implement the Watershed Plan was the formation of Drainage Area 104 (DA 104). New development within the DA 104 boundary is required to contribute to the DA 104 fund, which is earmarked for construction of infrastructure improvements in the watershed. A subsequent EIR evaluated the alternative sites for DA 104 and the Upper and Lower Sand Creek Basins were selected for construction of regional flood control facilities (Flood Control District 1992).

Upper Sand Creek Basin (USCB) was constructed in 1994 by funds from Assessment District 27 in Antioch; Lower Sand Creek Basin (LSCB) was constructed in 1995 by funds from Subdivision 7950. Both basins have each been constructed to an interim size and configuration large enough to mitigate urban runoff from specific sites, and only local drainage enters each basin. Ultimately, the basins will become regional facilities when Sand Creek is routed through the basins to substantially reduce peak flows and provide flood protection to regions around Sand Creek and Marsh Creek (Flood Control District 1992).

Sand Creek is the largest tributary in the lower Marsh Creek Watershed as it contributes approximately 15 square miles of watershed area to Marsh Creek (Flood Control District 2008). The primary goal of the improvements is to prevent flooding along the lower reach of Marsh Creek between Sand Creek and the Marsh Creek outfall into the Sacramento-San Joaquin River at Big Break in Oakley (Flood Control District 1992). The regional goal for USCB and LSCB is to attenuate peak flows from Sand Creek into Marsh Creek to 400 cubic feet per second for a 100-year storm event. Analyses of the Sand Creek drainage area indicates that 900-acre feet and 300-acre feet of flood storage capacity are ultimately required at the USCB and LSCB sites, respectively. The stormwater generated in the watershed will be conveyed by Sand Creek and local stormwater runoff to the two basins where it will be stored and released slowly through the basin outlets, reducing peak flows downstream and reducing the potential for flooding downstream properties (Flood Control District 2008).

## **EXISTING SETTING/PROPOSED PROJECT DESCRIPTION**

Contra Costa County has 31 major watersheds and sub-watersheds. Sand Creek Watershed is located within the Marsh Creek Watershed, the second largest watershed in the County (Contra Costa County 2003). Creek flows in the Marsh Creek Watershed originate in the Mount Diablo foothills (Morgan Territory) and flow down the eastern flanks of the Mount Diablo foothills. The terrain in the vicinity of USCB consists of rolling hills to its west, which slope to the east into flat lands in the vicinity of LSCB.

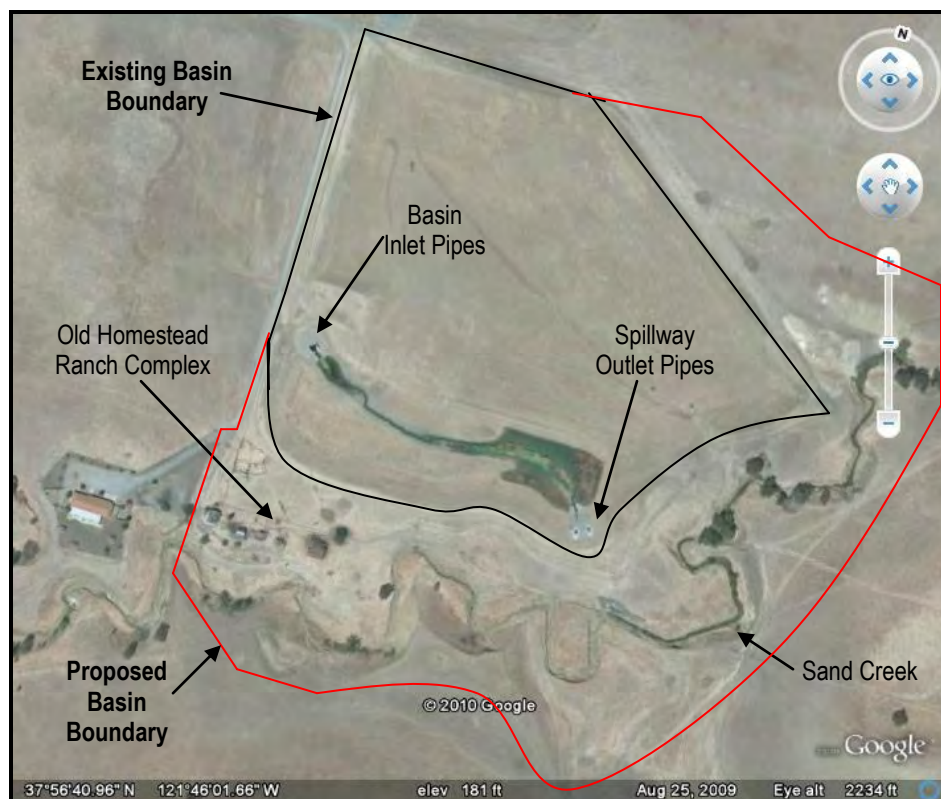
## Upper Sand Creek Basin

### Existing Setting

The USCB interim basin is located approximately 1,500 feet east of Deer Valley Road in Antioch. The natural terrain surrounding the site consists of rolling hills along the west and south that give way to flat lands to the north and east. Ground elevations in the area range 200 feet in elevation from the west to 180 feet in elevation to the east with a low of about 160 feet in elevation at the creek bottom to a high of about 330 feet in elevation atop the hill south of the basin (USGS 1953, 1978). Sand Creek borders the basin along its southern and eastern boundaries; the relatively steep banks are 15 to 20 feet high. Prior to construction of the interim basin, the elevation ranged from 194 feet along the west side of the basin to 180 feet along the east side.

The existing basin elevation ranges from 176 feet above mean sea level at the basin floor to 194 feet along the perimeter of the elevated berms. The interim basin has a flood storage capacity of 123-acre feet (GEI 2009). It receives local urban runoff from nearby residential developments to the north. The urban runoff flows into two 84-inch diameter inlet pipes at the northwest side of the basin which drains into a low-flow channel within the basin's floor and outfalls into Sand Creek via outfall pipes at the southeast side of the basin (GEI 2009) (Figure 1).

The low-flow channel within the basin floor contains wetland vegetation surrounded by annual grassland that has been used for cattle grazing.



**Figure 1: Upper Sand Creek Basin**

### *Project Design*

The USCB will be the first of the two basins to be expanded. The project will expand the approximate 41-acre basin to approximately 62 acres, increasing its flood storage capacity from 123-acre feet to 900-acre feet (35-foot maximum depth). The expansion will consist of excavating the basin floor to create a deeper basin where water will be held and slowly released downstream during major storm events. The basin will have multiple levels of excavation. Excavation depths will range from 0 to approximately 37 feet below existing grade, resulting in proposed basin elevations ranging from 158 feet above mean sea level in the lowest tier of the basin floor to 195 feet at the basin's perimeter. The basin expansion extends south of Sand Creek. The lowest (southern) tier will include Sand Creek; approximately 3,876 feet of Sand Creek will be excavated 10 feet below its current elevation of which approximately 3,612 feet will be reconstructed with a fluvial geomorphic (natural creek) design to restore and enhance Sand Creek within the basin; the remaining 264 feet will be re-created on-site as wetland acreage. The basin will have a continuous perimeter service road as well as ramps to the basin bottom and drainage structures for maintenance access (GEI 2009).

Soil removed from the excavation will be used to construct an earthen dam on the northeast side of the basin to impound flood waters from major storm events. Any remaining soil will be hauled off-site, stockpiled in the basin, or placed on adjacent parcel(s) for future use by interested parties. Three hydraulic structures will control stormwater flows: (1) basin inlets on the west side that receive upstream flows from Sand Creek and local urban runoff; (2) primary spillway/outfall pipe on the southeast side (under the dam) to drain low-flow or ponded water in the basin, and (3) an emergency spillway on the east side of the dam to direct flows greater than the 100-year storm event. The basin inlet structures will consist of a concrete box structure with an energy dissipater. Rock slope protection will be placed upstream and downstream of the inlets to protect against erosion. The primary spillway will consist of a headwall, an orifice and piping that will extend underneath the dam and discharge into Sand Creek. A manually-operated secondary spillway will also be constructed to allow the rapid drawdown of the basin in the event that large back-to-back storms are expected. The outfall to the creek will be through an energy dissipater located on the downstream toe of the dam. The emergency spillway will consist of a 225-foot wide broad-crested weir on the northeast side of the basin and an associated concrete-block chute that will direct overflows to Sand Creek. The basin perimeter will have a maintenance service road and associated access ramps into the basin (GEI 2009).

The basin will be a normally dry reservoir (except for low-flows) that will attenuate peak runoff by containing stormwater flows up to the 100-year storm event. During typical rains, the creek and local stormwater runoff flows will be carried through a low-flow channel and will discharge through the primary outlet pipe under the dam. It would release a maximum peak flow of 131 cubic feet per second. Creek flows that exceed the inlet-controlled discharge capacity of the outlet works from more severe storms will then pond in the basin and the basin stage will rise. After the peak of the storm has passed, and once the creek flow becomes smaller than the outlet discharge, the water stored in the basin will be passively released back to Sand Creek. For storms greater than the 100-year storm event, flood flows will pass over the emergency spillway and follow a controlled route to enter the creek downstream of the basin (GEI 2009).

Project construction will require real property transactions such as land acquisitions, permanent easement rights, and temporary construction easements on adjacent parcels. Construction is anticipated to start in spring 2011 and will take approximately 6 months to complete. However, depending on available funding, the project may be phased or constructed in later years.

## Lower Sand Creek Basin

### Existing Setting

The LSCB interim basin is located in Brentwood approximately 2 miles east downstream of USCB. The terrain surrounding the site is primarily flat with a topographic elevation ranging from 125 feet elevation above mean sea level from the west to 100 feet elevation to the east. The abandoned Old Sand Creek Road and the channelized Sand Creek parallel the northern side of the basin. Vacant fields adjoin the site to the north and east; residential developments adjoin the site to the south and west (Figure 2).



**Figure 2: Lower Sand Creek Basin**

The existing basin elevation ranges from approximately 98 feet elevation above mean sea level at the basin floor to 110 feet elevation along the perimeter of the elevated berms. It has a flood storage capacity of 40-acre feet. This interim basin receives local urban runoff from the adjacent development to the south and west. An 84-inch diameter basin inlet pipe at the northwest side of the basin drains the local urban runoff into a low flow channel within the basin's floor which drains into Sand Creek via outfall pipes at the northeast side of the basin (Figure 2).

Similar to USCB, the low flow channel contains wetland vegetation surrounded by nonnative grasses and weedy plant species.

### Project Design

Following the USCB expansion, the LSCB portion of the project will expand the approximate 19-acre interim basin to approximately 23 acres, increasing its flood storage capacity from 40-acre feet to 300-acre feet (22-foot maximum depth). The expansion will consist of excavating the basin floor to create a deeper basin where water will be held slowly and released downstream during

major storm events. Similar to USCB, the basin will have multiple levels of excavation. Excavation depths will range from 4 to 23.5 feet below existing grade resulting in basin elevations ranging from 88 feet above mean sea level in the lowest tier of the basin floor to 110 feet at the basin's perimeter. The basin expansion extends north of Sand Creek. The lowest (northern) tier will include Sand Creek; approximately 1,100 feet of Sand Creek will be excavated and reconstructed with a wetland mitigation area within the expanded basin.

Soil removed from the excavation will be used on-site where necessary and either hauled off-site or used for filling the adjacent City of Brentwood parcel that will be developed into a future park. LSCB includes construction of wing walls and inlet weir in Sand Creek at the northwest corner of the basin to direct upstream Sand Creek flows into the basin. During low flows, runoff that enters the basin will continue downstream, unattenuated, through a 60-inch diameter primary spillway/outfall pipe that will extend along the north side of the basin under a bench in the basin embankment. The 60-inch diameter pipe will continue approximately 1,300 feet downstream where it will discharge into the existing drop structure in Sand Creek at the northwest corner of Fairview Avenue and Sand Creek Road (Figure 2).

During significant storm events, higher flows will create increasing head at the inlet to the 60-inch diameter primary spillway pipe. The head will continue to rise until stormwater spills over the weir crest and into the basin. At peak operation (100-year storm), approximately 210 cubic feet per second (cfs) will continue downstream, through the 60-inch diameter primary spillway pipe, while approximately 1,050 cfs will spill over the weir into the basin. After the peak of the storm passes, the basin will drain via flap-gated openings that are proposed within the wall of the inlet weir. A perpetual pond will not occur in the basin as the low flow section will be graded to drain and an 18-inch diameter secondary drain pipe will be installed at the downstream side of the basin.

Project construction will require real property transactions such as land acquisitions, permanent easement rights, and temporary construction easements on adjacent parcels. Construction is anticipated to start in 2016 and will take approximately 6 months to complete.

## **SURROUNDING LAND USES AND SETTING**

### ***Upper Sand Creek Basin***

The immediate surrounding area primarily consists of undeveloped grasslands. An old ranch homestead complex, located within the proposed expansion area, and a formerly-occupied residential building, now owned and utilized by the Antioch Unified School District as a conference center, are located just southwest of the existing basin. A magnet school and Kaiser Hospital are located approximately ¼ mile to the north followed by residential developments. Sand Creek Road that will extend west from the planned Sand Creek Road/Highway 4 Bypass interchange in Brentwood will border the basin's north side. Developed areas in Brentwood are located approximately 4 miles to the east and southeast, which include commercial retail centers and residential neighborhoods located off of the Highway 4 Bypass.

### ***Lower Sand Creek Basin***

The surrounding area primarily consists of residential neighborhoods and commercial retail centers to the west. The vacant land immediately adjacent to the north side of the basin is planned for residential development; the vacant land immediately adjacent to the east side of the basin is owned by the City of Brentwood and is planned for a park.

## **OTHER PUBLIC AGENCIES WHOSE APPROVAL IS REQUIRED**

The following agency approvals will be required for both basin expansion projects:

### **East Contra Costa County Habitat Conservancy**

The East Contra Costa County Habitat Conservancy is a joint exercise of powers authority formed by the cities of Brentwood, Clayton, Oakley, Pittsburg and Contra Costa County to implement the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP). The HCP/NCCP provides a framework to protect natural resources in eastern Contra Costa County, while improving and streamlining the environmental permitting process for impacts on endangered species. The HCP/NCCP will allow the permittees (including the Contra Costa County Flood Control and Water Conservation District, Contra Costa Water District, and East Bay Regional Park District) to control endangered species permitting for activities and projects in the region that they perform or approve. The HCP/NCCP also provides for comprehensive species, wetlands, and ecosystem conservation and contributes to the recovery of endangered species in northern California. The HCP/NCCP avoids project-by-project permitting that is generally costly and time-consuming for applicants and often results in uncoordinated and biologically ineffective mitigation (Contra Costa County 2006).

The HCP/NCCP has identified both basin expansions as covered activities. Therefore, the project will comply with the HCP/NCCP.

### **U.S. Army Corps of Engineers – Sacramento District**

#### *Clean Water Act, Section 404 Permit*

Section 404 of the Clean Water Act regulates permanent and temporary discharges of dredged or fill material into jurisdictional waters of the United States, including wetlands. Sand Creek is considered jurisdictional waters of the U.S. (U.S. Army Corps of Engineers [Corps] 2010a). Therefore, a Section 404 permit will be obtained.

### **Regional Water Quality Control Board – Central Valley Region**

#### *Clean Water Act, Section 401, Water Quality Certification*

Section 401 of the Clean Water Act also regulates permanent and temporary discharges of dredged or fill material into jurisdictional waters of the United States, and waters of the state, including wetlands (California Regional Water Quality Control Board [CRWQCB] 2010a). Sand Creek is considered jurisdictional waters of the U.S. Therefore, the Flood Control District will obtain a Water Quality Certification.

### **State Water Resources Control Board**

#### *National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity*

Construction activities that disturb more than one acre of soil are required to obtain a NPDES permit which will require the contractor prepare and implement plans to prevent construction-related pollutants from contacting stormwater and keeping all products of erosion from moving off site into receiving waters (CRWQCB 2010b). Each basin expansion project will result in disturbance to more than one acre of soil. Therefore, coverage under the General Construction Permit will be obtained. .

**Department of Fish and Game – Region 3***Fish and Game Code, Section 1602, Lake and Streambed Alteration Agreement*

Notification is required when an activity will substantially divert or obstruct the natural flow of any river, stream or lake (California Department of Fish and Game [CDFG] 2010). Both basins include disturbances to Sand Creek. Therefore, the Department of Fish and Game will be notified.

**Department of Water Resources, Division of Safety of Dams**

The Division of Safety of Dams (DSOD) has jurisdiction of reservoirs if the dam height is more than 6 feet and it impounds 50 acre-feet or more of water, or if the dam is 25 feet or higher and impounds more than 15 acre-feet of water, unless it is federally-owned or exempted under special provisions described in Sections 6004, 6025, or 6026 of the California Water Code. The DSOD reviews and approves plans and specifications for the design of dams and oversees their construction to ensure compliance with the approved plans and specifications. The DSOD requires that an application be submitted for the construction, enlargement, repair, alteration or removal of a dam (California Department of Water Resources [CDWR] 2010). Both basins fall under DSOD jurisdiction.

**City of Antioch, City of Brentwood**

The City of Antioch and Brentwood may require grading permits and/or truck transportation permit for haul trucks (City of Antioch 2003a, City of Brentwood 2010a).

**ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:**

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Aesthetics                      | <input type="checkbox"/> Agriculture and Forest Resources | <input type="checkbox"/> Air Quality                        |
| <input checked="" type="checkbox"/> Biological Resources | <input type="checkbox"/> Cultural Resources               | <input type="checkbox"/> Geology/Soils                      |
| <input type="checkbox"/> Greenhouse Gas Emissions        | <input type="checkbox"/> Hazards & Hazardous Materials    | <input checked="" type="checkbox"/> Hydrology/Water Quality |
| <input type="checkbox"/> Land Use/Planning               | <input type="checkbox"/> Mineral Resources                | <input type="checkbox"/> Noise                              |
| <input type="checkbox"/> Population/Housing              | <input type="checkbox"/> Public Services                  | <input type="checkbox"/> Recreation                         |
| <input type="checkbox"/> Transportation/Traffic          | <input type="checkbox"/> Utilities/Service Systems        | <input type="checkbox"/> Mandatory Findings of Significance |

**DETERMINATION:**

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Claudia Gemberling  
NAME OF PREPARER

9-2-2010  
Date

SCC  
LEAD AGENCY NAME

9-9-10  
Date

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>I. AESTHETICS</b>				
Would the project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The USCB and LSCB are located northeast of Mount Diablo and south of the Sacramento-San Joaquin River Delta in a low-lying valley at the northeastern edge of the Mount Diablo foothills. This area provides a rural, small-town atmosphere and open space setting with expansive views of natural features such as Mount Diablo and the foothills to the west and south (City of Brentwood 2009b). While views of Mount Diablo and foothill ridgelines in the distance reflect the existing rural character, the visual context of the area is greatly influenced by surrounding development, creating a mixed rural and urban environment.

USCB is primarily surrounded by undeveloped grasslands; nearby developed areas include a magnet school, a Kaiser Hospital facility, and residential neighborhoods to the north. An old ranch homestead complex is located in the southwestern portion of the project area, which will be removed (Figure 1). The existing basin contains primarily grassland with the exception of seasonal wetland vegetation associated with the low flow drainage. Scattered oak and willow trees are scattered along the banks of Sand Creek. The project will result in removal of these trees.

LSCB is primarily surrounded by residential neighborhoods with commercial and retail centers to the west at the State Route 4 Bypass interchange. The basin is generally dominated by nonnative grasses and weedy plant species with the exception of seasonal wetland vegetation associated with the low flow drainage. Several red willow trees are scattered throughout the basin along with a Monterey pine and valley oak that occur just outside the fence line of the northern boundary (Figure 2). The project will result in removal of these trees.

## IMPACT DISCUSSION

*a) Would the project have a substantial adverse effect on a scenic vista?*

The ridgelines of Mount Diablo and foothills provide a scenic view from both basins. The project will not have a substantial adverse effect as no structures will be constructed that would compromise views of the surrounding hills visible from the nearby residential communities. Therefore, the project will have **no impact**.

*b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*

Neither USCB nor LSCB are located on or adjacent to a state scenic highway. While Deer Valley Road, located west of USCB, is considered a County scenic route, the basin expansion will not negatively affect the scenic views from Deer Valley Road (Contra Costa County 2005b). Therefore, the project will have **no impact**.

*c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?*

The surrounding areas for USCB and LSCB are continually being developed with residential communities transitioning the rural character of the area to a more suburban character. The City of Antioch (2003b) and City of Brentwood (2009c) General Plans have designated the areas surrounding both the USCB and LSCB as large-scale planned communities. While the vacant old ranch homestead complex at USCB retains much of its original character in its original setting, it is in an advanced state of disrepair with some of the structures so dilapidated that they are no longer structurally sound and are gradually collapsing. Deer Valley Road, the main corridor in the area of USCB, provides views of the rural setting of the area. While the old ranch homestead complex is currently visible from Deer Valley Road, views toward this complex are limited due to the narrow and somewhat winding roadway that is frequently travelled at higher speeds than its design speed. Further, views toward the ranch complex from the surrounding residential communities are limited due to distance and other obstructions associated with urban development.

The project would not substantially degrade the existing visual character or quality of the site and its surroundings at either basin as project features would primarily be located at grade and at sub-grade levels out of view of the surrounding area. In addition, disturbed areas and creek realignment will be re-planted and re-seeded with vegetation appropriate to the area which will re-establish the disturbed areas and enhance the visual setting. While construction of the basins will be visible from surrounding areas, it will be temporary ending upon completion of the project. Therefore, project impacts will be **less than significant**.

*d) Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?*

The projects and construction of the projects will not create a new source of permanent or temporary substantial light or glare. Therefore, the projects will have **no impact**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>II. AGRICULTURE AND FOREST RESOURCES</b>				
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with existing zoning for agriculture use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), Timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The California Farmland Mapping and Monitoring Program (FMMP) was established in 1982 in response to a critical need for assessing the location, quality, and quantity of agricultural lands and conversion of these lands over time. FMMP is a non-regulatory program and provides a consistent and impartial analysis of agricultural land use and land use changes throughout California. Creation of the FMMP was supported by the Legislature and a broad coalition of building, business, government, and conservation interests (California Department of Conservation [CDC] 2010a).

Prime Farmland has the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Farmland of Statewide Importance is similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Unique Farmland is of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California (CDC 2010a).

The California Land Conservation Act of 1965, better known as the Williamson Act (Act), created a program to help counties preserve agricultural land and open space by offering a tax incentive to property owners. The Act provides an arrangement where private landowners voluntarily restrict their land to agricultural and compatible open space uses under a contract with the County, known as a Land Conservation Contract. Contra Costa County has been implementing the Williamson Act since 1968 when the Board of Supervisors adopted Ordinance 68-53, which authorized the creation of Agricultural Preserves and the execution of Land Conservation Contracts pursuant to state law (CDC 2010b, Contra Costa County Department of Conservation and Development [CCCCDD] 2010).

Assembly Bill 32 (California Global Warming Solutions Act of 2006) recognizes that California is the source of substantial amounts of GHG emissions. Therefore, Senate Bill 97 amended the CEQA Guidelines, effective January 1, 2010, to establish that greenhouse gas (GHG) emissions and the effects of GHG are appropriate subjects for CEQA analysis (OPR 2008). There is a renewed attention on California forests and the role they play in the carbon cycle. The forest sector is the second largest global source of human-caused carbon dioxide emissions largely due to deforestation (California Climate Action Registry 2010). There is a need to understand how much carbon dioxide California forests are currently producing and sequestering, and how much they could sequester in the future (California Air Resource Board [CARB] 2010).

## IMPACT DISCUSSION

- a) *Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*

Prime Farmland, Unique Farmland, or Farmland of Statewide Importance lands do not occur within or immediately adjacent to USCB or LSCB (CDC 2009a). While the lands within and surrounding both basins are designated as Farmland of Local Importance, which is typically used for livestock grazing and dryland grain production, their respective cities have designated both areas as public facilities within large-planned communities. Therefore, project impacts will be **less than significant**.

- b) *Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?*

As discussed above, both basins are designated as Farmland of Local Importance, but neither are Williamson Act contract lands. In addition, both basins are designated as public facility use within large-planned communities. Therefore, the project will have **no impact**.

- c) *Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), Timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?*

Forest land is land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits. Timberland is non-federal government-owned land and designated as experimental forest land which is available for and capable of growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees (California Public Resources Code 2010). Timberland Production is the area that has

been zoned and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses (California Government Code 2010).

Neither basin is zoned as forest land, timberland, or Timberland Production as they are both designated for public facility use within large-planned communities. Therefore, the project will have **no impact**.

*d) Result in the loss of forest land or conversion of forest land to non-forest use?*

Neither basin is zoned as forest land, timberland, or Timberland Production as they are both designated for public facility use within large-planned communities. Therefore, the project will have **no impact**.

*e) Would the project involve other changes in the existing environment, which due to their location or nature, could result in conversion of Farmland to non-agricultural use?*

No cattle grazing occurs within the LSCB. Cattle grazing currently occurs within the USCB and adjacent parcels. However, cattle grazing will no longer continue at USCB after project completion in order to minimize erosion and protect re-vegetated areas. While cattle grazing will no longer occur at USCB, the basin has already been designated as a public facility within a large-planned community (City of Brentwood 2009c). Therefore, project impacts will be **less than significant**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>III. AIR QUALITY</b>				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Air quality is affected by the rate, amount, and location of pollutant emissions, and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, and air temperature, in combination with local surface topography (i.e., geographic features such as mountains and valleys), determine the effect of air pollutant emissions on local air quality. The combination of low wind speeds and low inversions produces the greatest concentration of air pollutants. On days without inversions, or on days of winds averaging over 15 miles per hour, smog potential is greatly reduced (CCTA 2009).

Both basins are located in the eastern portion of Contra Costa County which is generally well ventilated by winds flowing through the Carquinez Strait and Delta. While the terrain does not restrict ventilation, temperatures are quite warm, promoting the formation of ozone (Contra Costa County 2005d).

### **Regulatory Setting**

Air pollution can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage; or short-term acute effects such as eye watering, respiratory irritation, and headaches (Bay Area Air Quality Management District [BAAQMD] 2010a). The 1970 federal Clean Air Act established national ambient air quality standards for six criteria pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead; to protect public health and welfare. Amendments to the federal Clean Air Act require the U.S.

Environmental Protection Agency to classify air basins or portions of thereof, as either “attainment” or “nonattainment” for each criteria pollutant, based on whether or not the national standards have been achieved. The California Clean Air Act also requires areas to be designated as “attainment” or “nonattainment” based on whether or not state standards have been achieved. Under the federal and state Clean Air Acts, air basin jurisdictions with “nonattainment” areas are required to prepare air quality plans that include strategies for achieving attainment (CCTA 2009). The Bay Area Air Quality Management District (BAAQMD) is the primary agency responsible for assuring that the National and California Air Ambient Standards are attained and maintained in the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB is currently designated as a nonattainment area for state and national ozone standards, and national particulate matter (PM 10, PM 2.5) standards. The Bay Area 2010 Clean Air Plan (BAAQMD 2010a) includes strategies that are implemented through various BAAQMD programs and rules and regulations. Since the Bay Area was recently designated as non-attainment for the national PM 2.5 standard, the BAAQMD is required to prepare a PM 2.5 State Implementation Plan pursuant to federal air quality guidelines by December 2012 (BAAQMD 2010b).

In order to address global climate change associated with air quality impacts, CEQA statutes were amended to require evaluation of greenhouse gas (GHG) emissions (global pollutants) (discussed further in section VII) which includes criteria air pollutants (regional pollutants) and toxic air contaminants (local pollutants). As a result, the BAAQMD adopted CEQA thresholds of significance for criteria air pollutants and GHGs, and issued updated CEQA guidelines to assist lead agencies in evaluating air quality impacts to determine if a project’s individual emissions would be cumulatively considerable. Various modeling tools are used to estimate emissions based on the type of project (i.e., land use developments, linear transportation and utility projects) (BAAQMD 2010a).

In addition to criteria air pollutants, naturally-occurring asbestos (NOA), a toxic air contaminant, is also an air pollutant of concern. It can cause lung cancer and mesothelioma which is dependent upon the type of asbestos fibers inhaled and exposure levels. NOA is typically associated with serpentinite and ultramafic rocks formed in high-temperature environments below the surface of the earth when metamorphic conditions are right for the formation of asbestos. The BAAQMD requires that projects where NOA is likely to be found implement the best available dust mitigation measures in order to reduce and control dust emissions as well as notification to the BAAQMD (BAAQMD 2010a). Neither basin is located within an area identified as having rocks associated with NOA (CDC 2010c).

## **IMPACT DISCUSSION**

### *a) Would the project conflict with or obstruct implementation of the applicable air quality plan?*

The expanded flood control basins would not generate an increase of air pollutant concentrations. However, construction of the basin expansions would result in temporary increases of air pollutant concentrations from construction equipment and off-haul truck exhaust (criteria air pollutants) and soil excavations (PM dust). The project consists of excavating approximately 62 acres of the existing and expansion areas at USCB which would require the movement of approximately 420,000 cubic yards of soil. Approximately 105,000 cubic yards will be used on-site for construction of the “fill” dam; 40,000 cubic yards will be left on-site or on adjacent properties, and 110,200 cubic yards will be hauled away to nearby projects within a 10-mile radius (i.e., Highway 4/Loveridge Road Expansion in Antioch, Sand Creek Interchange in Brentwood, EBART in Antioch). Construction is currently planned for 2011 and will take approximately six months to complete.

Approximately 249,000 cubic yards of soil will be excavated from LSCB of which approximately 47,000 cubic yards will be used on-site, leaving approximately 202,000 cubic yards that will be hauled away or used for the adjacent City of Brentwood parcel that is planned for a future park and/or to nearby projects in need of soil within a 20-mile radius. Construction is currently planned for 2016 and will take approximately six months to complete.

The project did not meet the BAAQMD preliminary screening criteria due to the extent of soil movement and transport. Therefore, estimated construction emissions were quantified using the URBEMIS model (2007 version 9.2.4) to determine if project-related construction emissions exceed the BAAQMD daily significance thresholds (LSA 2010). Since specific types of construction equipment and vehicles are not known at this time, the following estimates are based on URBEMIS defaults based on acres to be disturbed and off-site hauls within a six-month period.

<b>Table 1: URBEMIS Model Estimates</b>						
<b>Basin</b>	<b>Total Area to be Disturbed</b>	<b>Maximum Daily Acreage to be Disturbed</b>	<b>Daily Onsite Cut/Fill</b>	<b>Daily Offsite Cut/Fill</b>	<b>Daily On-Road Truck Travel</b>	<b>Off-Road Equipment (Operating 8 hrs/day)</b>
USCB (2011)	62 acres	15.5 acres	1208 cubic yards	918 cubic yards	420.61 (vehicle miles traveled using 20-cubic yard truck within 10-mile round trip)	1 Excavator (168 horsepower [hp]) (0.57 load factor) 1 Grader (174 hp) ( 0.61 load factor) 1 Rubber Tired Dozer (357 hp) (0.59 load factor) 3 Tractors/Loaders/ Backhoes (108 hp) (0.55 load factor) 1 Water Truck (189 hp) (0.5 load factor)
LSCB (2016)	21 acres	5.25 acres	391 cubic yards	1683 cubic yards	1870.37 (vehicle miles traveled using 20-cubic yard truck within 20-mile round trip)	1 Grader (174 hp) (0.61 load factor) 1 Rubber Tired Dozer (357 hp) (0.59 load factor) 2 Tractors/Loaders/ Backhoes (108 hp) (0.55 load factor) 1 Water Truck (189 hp) (0.5 load factor)

As shown in Table 2 on the following page, neither basin expansions will exceed the daily significance thresholds.

<b>Table 2: BAAQMD Significance CEQA Threshold Levels for Construction-Related Emissions</b>			
<b>Criteria Air Pollutant/Precursor</b>	<b>Daily Average Emissions (lb s/day)</b>	<b>USCB Project Emissions (lbs/day)</b>	<b>LSCB Project Emissions (lbs/day)</b>
Reactive organic gas (ROG)	54	5.98	4.95
Carbon monoxide (CO)	N/A	28.26	24.69
Nitrogen oxides (NOx)	54	51.68	48.15
Particulate Matter 10 (PM10)	82 (exhaust)	2.76	1.99
Particulate Matter 2.5 (PM2.5)	54 (exhaust)	2.5	1.83
Greenhouse gases (GHGs)	N/A* 1,100 metric tons/year**	379.32 metric tons/year	575.93 metric tons/year

\* Significance threshold levels have not been determined at this time.

\*\* Significance threshold level for operational-related sources.

Based on the BAAQMD CEQA Guidelines, if daily average construction-related criteria air pollutants or precursors would not exceed any of the BAAQMD thresholds of significance, the project would result in a less-than-significant impact to air quality. However, the BAAQMD recommends the implementation of all *Basic Construction Mitigation Measures* as listed in Table 8-2 of the BAAQMD CEQA Guidelines whether or not construction-related emissions exceed applicable thresholds of significance. Therefore, the project will implement the following applicable air pollution control measures:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) will be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site will be covered.
- All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. Dry power sweeping will not be used.
- All vehicle speeds on unpaved roads will be limited to 15 mph.
- Idling times will be minimized by either shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. Clear signage will be provided for construction workers at all access points.
- All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- Signs will be posted with the telephone number and person to contact regarding dust complaints. Complaints will be corrected within 48 hours. The sign will also include the BAAQMD phone number to ensure compliance.

The project will also require demolition of the old homestead ranch at USCB. Demolition of existing buildings and structures are subject to BAAQMD Regulation 11, Rule 2 (Asbestos Demolition, Renovation, and Manufacturing). This Rule is intended to limit asbestos emissions associated with disturbance of asbestos-containing materials. It requires that lead agencies and their contractors notify BAAQMD of renovation or demolition activities. All asbestos-containing material found on the site must be removed prior to demolition or renovation activity and disposed of appropriately and safely (BAAQMD 2010a). The on-site buildings have the potential to contain asbestos-containing building materials and therefore, could result in airborne asbestos emissions during demolition activities. In accordance to the BAAQMD

Regulation 11, Rule 2, the Flood Control District or its contractor will notify the BAAQMD. All asbestos-containing materials will be removed and properly disposed of prior to demolition activities.

Implementation of the above-listed air pollution control measures is consistent with the air quality plans. Therefore, project impacts will be **less than significant**.

- b) *Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?*

The project would not violate any air quality standard or contribute substantially to an existing project air quality violation with implementation of the air pollution control measures described above. Therefore, project impacts will be **less than significant**.

- c) *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?*

The project would not result in a cumulatively considerable net increase of ozone with implementation of the air pollution control measures described above. Therefore, project impacts will be **less than significant**.

- d) *Would the project expose sensitive receptors to substantial pollutant concentrations?*

Sensitive receptors include those segments of the population most susceptible to poor air quality such as children, the elderly, and those with pre-existing serious health problems affected by air quality which are those places such as schools/schoolyards, parks and playgrounds, day care centers, nursing homes, hospitals, and residential communities (BAAQMD 2010a).

The expanded flood control basins would not generate permanent air pollutant concentrations. However, construction of the basin expansions would temporarily generate an increase in air pollutant concentrations from construction equipment exhaust and from soil excavations (particulate matter). The BAAQMD issued guidelines for estimating air quality health risk impacts to sensitive receptors associated with construction activity. Construction-related impacts can expose sensitive receptors to toxic air contaminants, including diesel particulate matter (BAAQMD 2010c). The guidelines are based on minimum distance between the project area boundary and the sensitive receptor. Based on the acreages of impact of USCB and LSCB, the offset required from sensitive receptors to avoid significant health risks is approximately 1,000 feet for USCB and 225 feet for LSCB. The closest sensitive receptor to USCB is the Kaiser Hospital facility which is approximately 2,400 feet from the project area. For LSCB, while there are residential developments that are within 225 feet along the west side of the project area, the project would not result in substantial pollutant concentrations with implementation of the air pollution control measures described above. Therefore, project impacts will be **less than significant**.

- e) *Would the project create objectionable odors affecting a substantial number of people?*

The expanded flood control basins would not generate permanent objectionable odors. However, construction of the basin expansions has the potential to generate an increase in objectionable odors from diesel exhaust of construction equipment. The USCB and surrounding

parcels are primarily undeveloped and not occupied by people; while LSCB is primarily surrounded by residential development, implementation of the air pollution control measures described above will minimize objectionable odors to nearby residences. In addition, construction will occur during the weekday hours when most residents are at work or school. Therefore, project impacts will be **less than significant**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>IV. BIOLOGICAL RESOURCES</b>				
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands as defined (including, but limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

#### **Regulatory Setting**

In 1973, the federal Endangered Species Act (ESA) was passed by Congress to protect ecosystems supporting special-status species to be administered by the U.S. Fish and Wildlife

Service (USFWS). The California Endangered Species Act (CESA) was passed as a parallel act to be administered by the California Department of Fish and Game (CDFG). Special-status species include:

- USFWS-designated listing of threatened or endangered species as well as candidate species;
- CDFG-designated listing of rare, threatened, or endangered species as well as candidate species;
- Species considered to be rare or endangered under the conditions of Section 15380 of the CEQA Guidelines such as those identified in the Inventory of Rare and Endangered Vascular Plants of California by the California Native Plant Society; and
- Other species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing, or rejection for state or federal status such as Species of Special Concern designated by the CDFG.

The USFWS and CDFG both publish lists of special-status species, which satisfy criteria classifying them as endangered. Species that have been proposed for listing but have not yet been accepted are classified as candidate species. Generally, the term endangered (federal, state) refers to a species that is in danger of becoming extinct throughout all or a significant portion of its range, while a threatened (federal, state) or rare (state) species is one that could become endangered in the foreseeable future (CDFG 2010, USFWS 2010).

### **East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan**

The USCB and LSCB are located within the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) inventory area (JSA 2006). The HCP/NCCP identifies various development and maintenance activities (covered activities) that have the potential to impact special-status species as well as sensitive habitats, natural communities, and federal and state jurisdictional waters and wetlands in eastern Contra Costa County. Activities not covered by the HCP/NCCP require direct consultation with the USFWS and CDFG. The HCP/NCCP covers 28 special-status species.

<b>Table 3: HCP/NCCP Covered Species</b>	
<b>Plants</b>	Mount Diablo manzanita, Brittscale, San Joaquin spearscale, Big tarplant, Mount Diablo fairy lantern, Recurved larkspur, Round-leaved filaree, Diablo helianthella, Brewer's dwarf flax, Showy madia, Adobe navarretia
<b>Invertebrates</b>	Longhorn fairy shrimp, Vernal pool fairy shrimp, Midvalley fairy shrimp, Vernal pool tadpole shrimp
<b>Amphibians</b>	California tiger salamander, California red-legged frog, Foothill yellow-legged frog
<b>Reptiles</b>	Silvery legless lizard, Alameda whipsnake, Giant garter snake, Western pond turtle
<b>Birds/Raptors</b>	Tricolored blackbird, Golden eagle, Western burrowing owl, Swainson's hawk
<b>Mammals</b>	Townsend's western big-eared bat, San Joaquin kit fox

The HCP/NCCP utilizes a variety of development-based fees to fund mitigation that will offset losses of various types of land cover, covered species habitat, and other biological values. The HCP/NCCP identifies measures to avoid or minimize impacts to special-status species. The avoidance and minimization measures are consistent with the USFWS and CDFG guidelines for the individual species. Special-status species not covered by the HCP/NCCP are also addressed in this document.

Qualified biologists reviewed federal, state, and local databases of special-status wildlife and plant species and conducted habitat assessments and wetland delineations (Nomad 2009a, RCL Ecology 2009). The habitat assessment meets the HCP/NCCP planning survey guidelines. The results of the habitat assessment and wetland delineation and the level of impacts to natural resources present in the project area are presented in the appropriate discussions below.

## ***Environmental Setting***

### ***Upper Sand Creek Basin***

Habitat assessments and a wetland delineation were conducted in spring and fall 2008 (Nomad 2009a,b). In addition, habitat assessments were also conducted of the adjacent Aviano-Williamson (LSA 2007) property on which a portion of the project will occur. The basin floor and slopes primarily contain annual and ruderal grassland that is grazed by cattle; the low-flow channel contains permanent and seasonal wetland vegetation (Photo 1).



Photo 1: Southeast view from basin inlet pipes in northwest portion of the basin.



Photo 2: Sand Creek upstream of outfall pipes.

Sand Creek borders the existing basin's southern boundary. This portion of Sand Creek is a narrow, incised channel with steep, eroded banks exhibiting high sinuosity. The low-flow channel (ordinary high water mark) ranges from 2 to 8 feet in width. It is characterized as an intermittent stream upstream of the basin outfall pipes, with generally low quality runs and pools, and is typically dry by June in most years. Few scattered riparian woodland and scrub trees such as valley oak, blue oak, and red willow occur on the banks of this portion of the creek (Nomad 2009a) (Photos 2 and 3). Habitat quality in this portion of the reach is poor based on the low water flow, high turbidity, relatively high water temperatures, and minimal emergent or aquatic vegetation required by many sensitive aquatic species as well as cattle grazing and human disturbances (refuse, stream crossings) within and along the creek (Photo 4). Aquatic species observed include western mosquitofish and red swamp crayfish. (Nomad 2009a).



Photo 3: Sand Creek with flow.



Photo 4: Cattle grazing impacts.

Downstream of the basin outfall pipes, the habitat quality of Sand Creek increases due to the perennial water flow from urban runoff (2 to 4 cubic feet per second), increased emergent and aquatic vegetation, trees, muddy to rocky substrate, and alternating run/pools (Photo 5). The shallow, rocky areas exhibited an overgrowth of algae inhabited by fish species threespine stickleback. Willow trees are present 300 to 400 feet downstream of the outfall near a deep pool with a stand of tules (Photo 6). East of the existing basin, a 200-foot section of Sand Creek has been used as a dump site for refuse, old appliances, and concrete. At the beginning of this disturbed area is a dirt road crossing that overlays three corrugated pipe culverts. Sand Creek narrows as it continues northeast and is characterized by steep, heavily vegetated streambanks and a moderate overstory of valley oak and blue oak trees. Sand Creek exits the proposed expansion area to the east in a moderately incised channel through non-native grasslands and agricultural lands with scattered riparian trees.



Photo 5: Outfall pipes.



Photo 6: Flows downstream of outfall pipes.

### **Lower Sand Creek Basin**

Habitat assessments and a wetland delineation were conducted in fall 2008 and spring 2009 (RCL Ecology 2009). Similar to USCB, LSCB contains a depressed basin with a low-flow channel. The basin floor and slopes primarily contain annual grassland; the low-flow channel contains wetland vegetation (cattails, tule, nutgrass, Baltic rush, cheeseweed, prickly lettuce, bristly ox-tongue, tall fescue) (Photo 7). Few scattered willow trees border the low flow channel of the basin.



Photo 7: Low-flow channel within basin.



Photo 8: Upstream view of Sand Creek.

Approximately 590 feet of Sand Creek borders the basin's northern boundary. This portion of Sand Creek is approximately 20 feet wide and is channelized with steep slopes. It contains a mixture of rock slope protection in some areas and vegetation in others, and a drop structure (Photo 8). Prior to stream channelization, it was an ephemeral stream, but is now characterized as a perennial stream due to urban runoff. The vegetation within Sand Creek is sparse, brushy, and dominated by non-native grasses. The creek habitat quality for fish and wildlife is compromised due to poor water quality from urban runoff and lack of shade and overhanging vegetation due to routine vegetation maintenance.

## IMPACT DISCUSSION

- a) *Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

A total of twenty-six (26) listed wildlife species have the potential to occur between both basins. Seven (7) of them are federal or state-listed as threatened or endangered, or designated as fully protected, and 19 are considered to be rare, sensitive or declining by agency or non-governmental watchlists.

Table 4: Special-Status Species That Have the Potential to be Present	
<b>Invertebrates</b>	Bridge's coast range shoulderband snail <sup>9</sup> , Curved-foot hygrotus diving beetle <sup>9</sup> ,
<b>Fish</b>	None
<b>Amphibians</b>	California red-legged frog <sup>2,8,10</sup> , California tiger salamander <sup>2,8,10</sup>
<b>Reptiles</b>	None
<b>Birds of Prey and Migratory Birds<sup>14</sup></b>	Allen's hummingbird <sup>9</sup> , California horned lark <sup>10,11</sup> , Cooper's hawk <sup>10,11</sup> , ferruginous hawk <sup>4,11,12</sup> , golden eagle <sup>7,10,12</sup> , grasshopper sparrow <sup>8</sup> , loggerhead shrike <sup>4,8</sup> , merlin <sup>9,12</sup> , Nuttall's woodpecker <sup>9</sup> , oak titmouse <sup>9</sup> , Swainson's hawk <sup>5,10</sup> , tricolored blackbird <sup>8,10</sup> , western burrowing owl <sup>8,10</sup> , white-tailed kite <sup>7</sup>
<b>Mammals</b>	American badger <sup>8</sup> , pallid bat <sup>8</sup> , San Joaquin kit fox <sup>1,6,10</sup> , San Joaquin pocket mouse <sup>9</sup> , western red bat <sup>8</sup>

<sup>1</sup>Federal-listed endangered; <sup>2</sup>federal-listed threatened; <sup>3</sup>Critical Habitat; <sup>4</sup>USFWS Bird Conservation Concern List; <sup>5</sup>state-listed endangered; <sup>6</sup>state-listed threatened; <sup>7</sup>California Fully Protected; <sup>8</sup>California Species of Special Concern; <sup>9</sup>California Department of Fish and Game Special Animal List; <sup>10</sup>HCP/NCCP Covered Species; <sup>11</sup>California Watch List; <sup>12</sup>Audobon Watch List; <sup>13</sup>California Native Plant Society List 1B.1 (seriously endangered in California) <sup>14</sup>U.S. Migratory Bird Treaty Act

Both basin expansions are covered by the HCP/NCCP. Therefore, potential project impacts will have a less than significant impact with implementation of required compensatory mitigation and species-specific avoidance and minimization measures as described below.

**IMPACT BIO-1:** The project will result in permanent and temporary impacts to suitable habitat for the above-listed species. Permanent impacts include removing natural habitat for the construction of the basin dam and hydraulic structures and temporary impacts from excavation and construction-related activities. Construction of the project may result in incidental take of these species.

**MITIGATION MEASURE BIO-1:**

The Flood Control District will pay the applicable HCP/NCCP development and wetland fees, including a temporary impact fee. These fees will be based on the acreage of land impacted by the project according to the HCP/NCCP fee calculator and will be paid to the East Contra Costa County Habitat Conservancy at award of the construction contract. Implementation of this measure and the following species avoidance and minimization measures in accordance to the HCP/NCCP will reduce project impacts to **less than significant**.

**AVOIDANCE AND MINIMIZATION MEASURE BIO-1A:**

**CALIFORNIA RED-LEGGED FROG AND CALIFORNIA TIGER SALAMANDER**

- No preconstruction surveys are required by the HCP/NCCP.
- Written notification to USFWS, CDFG, and the HCP/NCCP Implementing Entity, including photos and breeding habitat assessment, is required prior to disturbance of any suitable breeding habitat. The project proponent will also notify these parties of the approximate date of removal of the breeding habitat at least 30 days prior to this removal to allow USFWS or CDFG staff to translocate individuals, if requested. USFWS or CDFG must notify the project proponent of their intent to translocate CTS within 14 days of receiving notice from the project proponent. The applicant must allow USFWS or CDFG access to the site prior to construction if they request it.
- There are no restrictions under this HCP/NCCP on the nature of the disturbance or the date of the disturbance unless CDFG or USFWS notify the project proponent of their intent to translocate individuals within the required time period. In this case, the project proponent must coordinate the timing of disturbance of the breeding habitat to allow USFWS or CDFG to translocate the individuals. USFWS and CDFG shall be allowed 45 days to translocate individuals from the date the first written notification was submitted by the project proponent (or a longer period agreed to by the project proponent, USFWS, and CDFG).
- No construction monitoring is required by the HCP/NCCP.

**AVOIDANCE AND MINIMIZATION MEASURE BIO-1B:**

**SAN JOAQUIN KIT FOX (SJKF)**

- Prior to any ground disturbance related to covered activities, a USFWS/CDFG-approved biologist will conduct a preconstruction survey in areas identified in the planning surveys as supporting suitable breeding or denning habitat for SJKF. The surveys will establish the presence or absence of SJKF and/or suitable dens and

evaluate use by kit foxes in accordance with USFWS survey guidelines (U.S. Fish and Wildlife Service 1999). Preconstruction surveys will be conducted within 30 days of ground disturbance. On the parcel where the activity is proposed, the biologist will survey the proposed disturbance footprint and a 250-foot radius from the perimeter of the proposed footprint to identify SJKF and/or suitable dens. Adjacent parcels under different land ownership will not be surveyed. The status of all dens will be determined and mapped. Written results of preconstruction surveys will be submitted to USFWS within 5 working days after survey completion and before the start of ground disturbance. Concurrence is not required prior to initiation of covered activities. If San Joaquin kit foxes and/or suitable dens are identified in the survey area, the measures described below will be implemented.

- If a SJKF den is discovered in the proposed project footprint, the den will be monitored for 3 days by a USFWS/CDFG-approved biologist using a tracking medium or an infrared beam camera to determine if the den is currently being used.
- Unoccupied dens will be destroyed immediately to prevent subsequent use.
- If a natal or pupping den is found, USFWS and CDFG will be notified immediately. The den will not be destroyed until the pups and adults have vacated and then only after further consultation with USFWS and CDFG.
- If kit fox activity is observed at the den during the initial monitoring period, the den will be monitored for an additional 5 consecutive days from the time of the first observation to allow any resident animals to move to another den while den use is actively discouraged. For dens other than natal or pupping dens, use of the den can be discouraged by partially plugging the entrance with soil such that any resident animal can easily escape. Once the den is determined to be unoccupied it may be excavated under the direction of the biologist. Alternatively, if the animal is still present after 5 or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant (*i.e.*, during the animal's normal foraging activities).
- If dens are identified in the survey area outside the proposed disturbance footprint, exclusion zones around each den entrance or cluster of entrances will be demarcated. The configuration of exclusion zones should be circular, with a radius measured outward from the den entrance(s). No covered activities will occur within the exclusion zones. Exclusion zone radii for potential dens will be at least 50 feet and will be demarcated with four to five flagged stakes. Exclusion zone radii for known dens will be at least 100 feet and will be demarcated with staking and flagging that encircles each den or cluster of dens but does not prevent access to the den by kit fox.

#### **AVOIDANCE AND MINIMIZATION MEASURE BIO-1C:**

##### **SWAINSON'S HAWK**

Trees will be removed during the non-nesting season (September 16 - March 14). However, if removal occurs during the nesting season (March 15 – September 15), the following measures will be implemented:

- Prior to any ground disturbance related to covered activities that occurs during the nesting season (March 15–September 15), a qualified biologist will conduct a

preconstruction survey no more than 1 month prior to construction to establish whether Swainson's hawk nests within 1,000 feet of the project site are occupied. If potentially occupied nests within 1,000 feet are off the project site, then their occupancy will be determined by observation from public roads or by observations of Swainson's hawk activity (e.g., foraging) near the project site. If nests are occupied, minimization measures and construction monitoring are required (see below).

- During the nesting season (March 15–September 15), covered activities within 1,000 feet of occupied nests or nests under construction will be prohibited to prevent nest abandonment. If site-specific conditions or the nature of the covered activity (e.g., steep topography, dense vegetation, limited activities) indicate that a smaller buffer could be used, the East Contra Costa County Habitat Conservancy (Implementing Entity) will coordinate with CDFG/USFWS to determine the appropriate buffer size.
- If young fledge prior to September 15, covered activities can proceed normally. If the active nest site is shielded from view and noise from the project site by other development, topography, or other features, the project applicant can apply to the Implementing Entity for a waiver of this avoidance measure. Any waiver must also be approved by USFWS and CDFG. While the nest is occupied, activities outside the buffer can take place.
- All active nest trees will be preserved on-site, if feasible. Nest trees, including non-native trees, lost to covered activities will be mitigated by the project proponent according to the requirements below.

If preconstruction surveys identify Swainson's hawk nest trees that cannot be avoided by construction, the loss of these trees will be mitigated by the Flood Control District by:

- a) If feasible on-site, planting 15 saplings for every tree lost with the objective of having at least 5 mature trees established for every tree lost according to the requirements listed below.

AND either:

1. Pay the Implementing Entity (East Contra Costa County Habitat Conservancy) an additional fee to purchase, plant, maintain, and monitor 15 saplings on the HCP/NCCP Preserve System for every tree lost according to the requirements listed below, OR
2. The project proponent will plant, maintain, and monitor 15 saplings for every tree lost at a site to be approved by the Implementing Entity (e.g., within an HCP/NCCP Preserve or existing open space linked to HCP/NCCP preserves), according to the requirements listed below.

The following requirements will be met for all planting options:

- b) Tree survival shall be monitored at least annually for 5 years, then every other year until year 12. All trees lost during the first 5 years will be replaced. Success will be reached at the end of 12 years if at least 5 trees per tree lost survive without supplemental irrigation or protection from herbivory. Trees must also survive for at least three years without irrigation.

- c) Irrigation and fencing to protect from deer and other herbivores may be needed for the first several years to ensure maximum tree survival.
- d) Native trees suitable for this site should be planted. When site conditions permit, a variety of native trees will be planted for each tree lost to provide trees with different growth rates, maturation, and life span, and to provide a variety of tree canopy structures for Swainson's hawk. This variety will help to ensure that nest trees will be available in the short term (5-10 years for cottonwoods and willows) and in the long term (e.g., Valley oak, sycamore). This will also minimize the temporal loss of nest trees.
- e) Riparian woodland restoration conducted as a result of covered activities (i.e., loss of riparian woodland) can be used to offset the nest tree planting requirement above, if the nest trees are riparian species.
- f) Whenever feasible and when site conditions permit, trees should be planted in clumps together or with existing trees to provide larger areas of suitable nesting habitat and to create a natural buffer between nest trees and adjacent development (if plantings occur on the development site).
- g) Whenever feasible, plantings on the site should occur closest to suitable foraging habitat outside the undeveloped area (UDA).
- h) Trees planted in the HCP/NCCP preserves or other approved offsite location will occur within the known range of Swainson's hawk in the inventory area and as close as possible to high-quality foraging habitat.

#### **AVOIDANCE AND MINIMIZATION MEASURE BIO-1D:**

##### **WESTERN BURROWING OWL**

- Prior to any ground disturbance related to covered activities, a USFWS/CDFG-approved biologist will conduct a preconstruction survey in areas identified in the planning surveys as having potential burrowing owl habitat. The surveys will establish the presence or absence of western burrowing owl and/or habitat features and evaluate use by owls in accordance with CDFG survey guidelines.
- On the parcel where the activity is proposed, the biologist will survey the proposed disturbance footprint and a 500-foot radius from the perimeter of the proposed footprint to identify burrows and owls. Adjacent parcels under different land ownership will not be surveyed.
- Surveys will take place near sunrise or sunset in accordance with CDFG guidelines.
- All burrows or burrowing owls will be identified and mapped.
- Surveys will take place no more than 30 days prior to construction.
- During the breeding season (February 1 – August 31), surveys will document whether burrowing owls are nesting in or directly adjacent to disturbance areas. During the nonbreeding season (September 1 – January 31), surveys will document whether burrowing owls are using habitat in or directly adjacent to any disturbance area. Survey

results will be valid only for the season (breeding or nonbreeding) during which the survey is conducted.

- If burrowing owls are found during the breeding season (February 1 – August 31), the project proponent will avoid all nest sites that could be disturbed by project construction during the remainder of the breeding season or while the nest is occupied by adults or young. Avoidance will include establishment of a non-disturbance buffer zone. Construction may occur during the breeding season if a qualified biologist monitors the nest and determines that the birds have not begun egg-laying and incubation or that the juveniles from the occupied burrows have fledged. During the nonbreeding season (September 1 – January 31), the project proponent will avoid the owls and the burrows they are using, if possible. Avoidance will include the establishment of a buffer zone.
- If occupied burrows cannot be avoided, passive relocation will be implemented. Owls will be excluded from burrows in the immediate impact zone and within a 160-foot buffer zone by installing one-way doors in burrow entrances. These doors will be in place for 48 hours prior to excavation. The project area will be monitored daily for 1 week to confirm that the owl has abandoned the burrow. Whenever possible, burrows will be excavated using hand tools and refilled to prevent reoccupation. Plastic tubing or a similar structure will be inserted in the tunnels during excavation to maintain an escape route for any owls inside the burrow.

#### **AVOIDANCE AND MINIMIZATION MEASURE BIO-1E:**

##### **OTHER BIRDS/RAPTORS PROTECTED BY THE U.S. MIGRATORY BIRD TREATY ACT**

Fish and Game Code 3503.5 protects all birds of prey which include raptors, falcons, and owls. Migratory birds are protected under the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10 including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Under the MBTA, nests of migratory birds that contain eggs are not to be disturbed during the breeding season.

The nesting season varies depending on the bird species; the general nesting season is February 1 to August 31. Trees will be removed at both basins. These trees could provide suitable habitat for nesting birds. To avoid the potential for impacts to active nests the following measures will be followed:

- If feasible, the trees will be removed during the general non-nesting season (September 1 – January 31). Otherwise, a preconstruction survey for active nests will be conducted by a qualified biologist no more than 30 days prior to construction. If no active nests are found, then no additional avoidance and minimization measures are necessary.
- If an active nest is located within 250 feet of the construction area, the qualified biologist will:
  - Record the location(s) on a site map.
  - Establish a minimum 250 feet buffer zone to be delineated with Environmentally Sensitive Area [ESA] fencing around the nest tree or nest location. The buffer zone

will be maintained until the end of the breeding season. No construction activities will occur within 250 feet of a nest tree or nest location while young are in the nest.

- A biologist will monitor the nest weekly during construction to evaluate potential disturbance caused by construction activities. Once the biologist has determined that nestlings have fledged, the nest will be removed.
- If establishment of a buffer is not practical, DFG and/or USFWS will be contacted for further avoidance and minimization guidelines.

Preconstruction surveys conducted and avoidance and minimization measures for the above-listed species will also address other special-status species not covered by HCP/NCCP (i.e., Bridge's coast range shoulderband snail, Curved-foot hygrotus diving beetle, American badger, pallid bat, San Joaquin pocket mouse, western red bat). If species are found and they cannot be avoided, avoidance and minimization measures outlined in the Biological Resources Assessment report (Nomand 2009a) will be implemented.

- b) *Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

Many of the riparian areas and streams in the lowlands of east Contra Costa County have been severely affected by development. Streams including Sand Creek have either been devoid of vegetation or contain only narrow bands of remnant vegetation. In the upland portions, especially in the open grasslands, livestock grazing practices have resulted in heavily degraded or denuded riparian areas (JSA 2006).

Four sensitive natural communities are present within USCB: permanent wetland, seasonal wetland, riparian woodland/scrub, and stream. Two natural communities are present within LSCB: seasonal wetland and stream. These sensitive natural communities are important for a wide variety of wildlife species as they provide breeding, resting, and/or foraging habitat.

#### **Permanent Wetland**

Permanent wetlands (also referred to as perennial wetlands) are characterized by a year-round water source. They are typically dominated by erect, rooted, herbaceous hydrophytic plant species adapted to growing in conditions of prolonged inundation. Common plant species present in this land cover type include cattails and tules. Common wildlife species include waterfowl (great blue heron, great egret, ducks, killdeer), amphibians (red-legged frog, western pond turtle, garter snakes, and mammals (mule deer).

The USCB contains approximately 0.47 acre of permanent wetland in the man-made drainage channel in the existing basin and along a portion of the banks within the channel of Sand Creek. These wetlands are dominated by narrow-leafed cattail and water cress, and also include American tule, salt rush, Baltic rush, water bentgrass, spiny buttercup, cursed crowfoot, whorled marsh pennywort, brass-buttons, and rabbitsfoot grass.

#### **Seasonal Wetland**

Seasonal wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall until the first substantial rainfall. The vegetation is composed of wetland generalist plants such as hyssop loosestrife, cocklebur, and Italian ryegrass that typically occur frequently along streams. During the wet

season, these wetlands are commonly used by a variety of wildlife, including various amphibians (western spadefoot toad, Pacific chorus frog, western toad, California tiger salamander), waterfowl (killdeer, black-necked stilt, and American avocet); and birds (Brewer's blackbird, red-winged blackbird, brown-headed cowbird, American pipit). During the dry season, a variety of small mammals use the areas, including deer mouse, California vole, and long-tailed weasel. Raptors such as white-tailed kites, northern harrier, and red-tailed hawk may forage in this land cover type (JSA 2006).

The USCB contains approximately 2.18 acres of seasonal wetlands within the basin along the margins of the man-made drainage channel and one adjacent to and above the basin inlet. Seasonal wetland species present in the drainage channel include California semaphore grass, rabbitsfoot grass, brass-buttons, water cress, green dock, spiny buttercup, cursed crowfoot, Italian ryegrass, meadow barley, hyssop loosestrife, and strawberry clover; species present above the basin inlet include stalked popcorn flower, dwarf allocarya, green dock, and toad rush.

The LSCB contains approximately 1.03 acres of seasonal wetlands within the basin towards the end of the man-made drainage channel. The seasonal wetland is dominated by native and non-native forbs with a few willow trees. Dominant species are Baltic rush, tall fescue, curly dock, and sow thistle.

### **Stream**

A stream is defined as a long, narrow body of flowing water that occupies a channel with defined bed and bank and moves to lower elevations under the force of gravity. A stream is either perennial (flowing water year-round), intermittent (flowing water during certain times of the year, when groundwater provides water for stream flow), or ephemeral (flowing water only during and for a short duration after precipitation events in a typical year) (JSA 2006). Streams provide essential habitat for terrestrial and aquatic species; many upland species rely on streams as water sources. In summer and early fall, perennial streams provide the only available water in an otherwise dry landscape. In addition, all stream types provide habitat for aquatic macroinvertebrates, which are an important food source for local and downstream populations of fish, birds, and other wildlife (JSA 2006).

Sand Creek at USCB is an intermittent stream upstream of the basin outfall pipes and perennial downstream of the pipes due to yearly urban runoff into the basin. Approximately 3,876 feet of Sand Creek occurs within the expansion area. The entire creek length within the expansion area will be permanently impacted for the placement of earthen material for the dam and basin slopes, basin inlet and outlet structures and associated erosion control materials, and excavation and realignment of the remaining creek. The remaining creek will be excavated 10 feet below the existing grade and recreated with a fluvial geomorphic (natural creek) design and restored with a revegetation planting plan that will provide an enhanced creek corridor. The loss of 264 feet of creek will be mitigated on-site with the creation of wetlands.

Sand Creek at LSCB is a perennial stream. Approximately 1,100 feet of Sand Creek occurs within the expansion area. Approximately 1,060 feet of Sand Creek will be permanently impacted for the basin embankment, drain inlet and outlet structures and associated erosion control materials, and creation of a low-flow drainage and wetland mitigation area for the loss of the creek.

### **Riparian Woodland/Scrub**

The riparian/woodland scrub land cover type is dominated by phreatophytic woody vegetation associated with streams and permanent water sources. Riparian woodland is dominated by trees and contains an understory of shrubs and forbs. Riparian scrub is dominated by young trees and shrubs, typically representing an early successional stage of riparian woodland. This land cover type is dominated by a mixture of trees and shrubs adapted to saturated and/or flooded soil conditions such as Fremont cottonwood, western sycamore, and red willow. The understory may also include woody shrubs such as arroyo willow and mule fat. This natural community provides habitat for a wide diversity of wildlife. Some intermittent and ephemeral streams in this part of the County are dominated by a narrow corridor of oaks, California bay, or California buckeye with only scattered riparian tree species (e.g. willows and cottonwoods). The presence of flowing water within these communities attracts numerous mammals, amphibians, and reptiles. Riparian corridors are also important for deer migration. Common mammals found in this community include mule deer, raccoon, gray fox, striped skunk, deer mouse, harvest mouse, broad-handed mole, and dusky-footed woodrat. Because of their proximity to rangelands, many riparian areas are grazed by livestock. Birds typically found in this community include yellow warbler, northern flicker, white-tailed kite, Cooper's hawk, red-shouldered hawk, song sparrow, and grosbeak (JSA 2006).

USCB contains riparian woodland/scrub along Sand Creek at the downstream end of the project area, which consists of an open canopy overstory of red willow trees and further downstream, the overstory is composed of willow and oak trees. Other tree and shrub species include California rose, blue elderberry, blue witch, and tree tobacco. The understory includes herbaceous species such as California man-root, broad-leaved pepperweed, Bermuda buttercup, white fiesta flower, miner's lettuce, and common chickweed. LSCB contains a few willow trees within the low-flow drainage area of the basin and an oak and a pine tree along the northern boundary of the basin.

Most of the trees that occur along Sand Creek within USCB will be removed; the trees within the LSCB basin and along its northern boundary will be removed.

### **IMPACT BIO-2:**

Construction of these basins will remove portions of the natural communities identified above.

### **MITIGATION MEASURE BIO-2:**

Permanent and temporary impacts will be mitigated through payment of fees to the East Contra Costa County Habitat Conservancy as identified in the Development Fee Table 9-4 and Wetland Mitigation Fee Table 9-5 in Chapter 9 of the HCP/NCCP which are updated annually (East Contra Costa County Habitat Conservancy 2010). In addition, impacts will also be mitigated on-site with the creation of an enhanced creek corridor at USCB and a wetland mitigation area at LSCB. These restoration activities will be consistent with the restoration plan requirements outlined in the HCP/NCCP.

- c) *Would the project have a substantial adverse effect on federally protected wetlands as defined (including, but limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

As discussed above, both basin expansion areas contain streams and wetlands that will be permanently and temporarily impacted. Wetland delineations were conducted at both sites. The wetland delineation conducted at USCB was verified by the U.S. Army Corps of Engineers (Corps), the federal agency that has jurisdiction on most waterways and associated wetlands.

Sand Creek and associated wetlands at USCB were determined to be under the Corps jurisdiction whereas the manmade drainage channel and associated wetlands located within the existing basin was determined to not be in Corps jurisdiction as it was created in uplands and was never part of a natural waterway. One seasonal wetland located adjacent and above the basin inlet structure was determined to be under Corps jurisdiction (U.S. Army Corps of Engineers 2010). While the man-made drainage channel and its associated wetlands are not federally-protected, they are state-protected under the State Water Resources Control Board.

The wetland delineation for LSCB has not been verified by the Corps. It is similar to the USCB as the man-made drainage channel and associated wetlands within the existing basin were also constructed in uplands and were not part of natural waterway. Therefore, the Corps will likely not take jurisdiction over these features; however the Corps will likely take jurisdiction over the adjacent Sand Creek.

Permit applications will be submitted to the Corps and the Central Valley Regional Water Quality Control Board detailing the areas of permanent and temporary impacts and planned on-site mitigation efforts and HCP/NCCP fees.

At USCB, approximately 3,876 feet of Sand Creek occurs within the expansion area of which approximately 264 feet of the creek will be permanently lost. Approximately 3,612 feet of the creek will be re-created on-site with a fluvial geomorphic (natural creek) design that will be restored with a vegetation planting plan that will provide an enhanced creek corridor; the remaining 264 feet lost will be mitigated on-site with wetlands as out-of-kind mitigation. At LSCB, approximately 1,100 feet of Sand Creek occurs within the expansion area of which approximately 1,060 feet will be permanently impacted for the embankment, inlet and outlet structures and associated erosion control materials. A low-flow drainage area and wetlands will be re-created in the basin to offset the loss of Sand Creek.

### **IMPACT BIO-3:**

Construction of these basins will permanently and temporarily impact waters of the U.S. and seasonal wetlands.

### **MITIGATION MEASURE BIO-3:**

Permanent and temporary impacts for the basin structures will be mitigated through payment of fees to the East Contra Costa County Habitat Conservancy as identified in the Development Fee Table 9-4 and Wetland Mitigation Fee Table 9-5 in Chapter 9 of the HCP/NCCP which are updated annually (East Contra Costa County Habitat Conservancy 2010). In addition, impacts will also be mitigated on-site with the creation of an enhanced creek corridor at USCB and a wetland mitigation area at LSCB. These restoration activities will be consistent with the restoration plan requirements outlined in the HCP/NCCP.

- d) *Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

Habitat loss, fragmentation, and degradation resulting from land use changes or habitat conservation can alter the use and viability of wildlife movement corridors (i.e., linear habitats that naturally connect and provide passage between two or more otherwise disjunct larger habitats or habitat fragments) (Nomad 2009a).

Both basins lie within Lone Tree Valley with largely unrestricted access to the northwestern-most extent of the Diablo Mountain Range, which functions as a regional movement corridor. This regional corridor extends from the eastern foothills of Mt. Diablo and Black Diamond Mines Regional Park southeast toward the Altamont Pass. This land tract promotes the dispersal and gene flow between a variety of plant and animal subpopulations occurring within the region. Sand Creek drains the Lone Tree and Horse Valleys and provides connectivity to upper and lower portions of the watershed occupied by several federally and state listed and locally sensitive wildlife species (Nomad 2009a). USCB provides connectivity to adjacent habitats to the east, west, and south whereas LSCB is largely surrounded by adjacent urbanization.

While the basin expansions will not result in permanent disruption to movement of wildlife species, construction of the project and subsequent recovery of restored areas may temporarily inhibit dispersal, migration, and daily movement of common, listed and rare wildlife. However, the restoration and enhancement of the portions of Sand Creek impacted at USCB and LSCB will result in a net benefit to wildlife by increasing the value of the stream corridors for movement and dispersal of wildlife. In addition, permanent impacts that cannot be restored will be offset by payment to the East Contra Costa County Habitat Conservancy as discussed above. Therefore, project impacts will be **less than significant** with incorporation of Mitigation Measures BIO-1 to BIO-3.

- e) *Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

Both basins will require removal of trees. While both basins are located within the cities of Antioch (USCB) and Brentwood (LSCB), the basins are owned by the Flood Control District which falls within the jurisdiction of Contra Costa County. While the Flood Control District is not subject to the County Tree Ordinance, tree removals will be mitigated through payment of fees to the East Contra Costa County Habitat Conservancy as well as on-site mitigation as discussed above. Therefore, project impacts will be **less than significant** with incorporation of Mitigation Measures BIO-1 to BIO-3.

- f) *Would the project conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan?*

As discussed above, the HCP/NCCP provides specific avoidance and mitigation measures for direct and cumulative impacts to covered special-status species and habitats and jurisdictional wetlands and other waters in eastern Contra Costa County. Both basins are listed as a covered activity (Construction and Expansion of Flood Control Basins) in the HCP/NCCP (Table 2-5). The Flood Control District will implement the applicable restoration plan measures for the restoration of Sand Creek within the basins as outlined in section 5.3.2 of the HCP, and will pay the applicable mitigation fees as summarized in this section. Therefore, the project will have **no impact** as it will not conflict with the provisions of the HCP/NCCP.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>V. CULTURAL RESOURCES</b>				
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### ***Regulatory Background***

Cultural resources in California are protected by a number of federal, state, and local regulations and ordinances. The most frequently applied legislation consists of the provisions of CEQA that provide for the documentation and protection of significant prehistoric and historic resources. Prior to the approval of discretionary projects and the commencement of agency undertakings, the potential impacts of the project on archaeological and historical resources must be considered (Public Resources Code Sections 21083.2 and 21084.1 and the CEQA Guidelines [California Code of Regulations Title 14, Section 15064.5]).

The CEQA Guidelines define a significant historical resource as “a resource listed or considered eligible for listing on the California Register of Historical Resources” (CRHR) (Public Resources Code Section 5024.1). A cultural resource may be eligible for listing on the CRHR if it:

1. is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
2. is associated with the lives of persons important in our past;
3. embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual, or possesses high artistic values; or
4. has yielded, or may be likely to yield, information important in prehistory or history.

In order to determine if the area contains potential significant cultural and/or historical resources, qualified archaeologists and historians reviewed records from the Northwest Information Center (NWIC) at California State University, Sonoma in Rohnert Park, California and conducted field

investigations (David Chavez & Associates 2004, William Self Associates 2008, 2010). In addition, the Native American Heritage Commission (NAHC) and local Native American representatives were contacted for information of unrecorded Native American cultural sites (NAHC 2003, 2009, 2010).

### ***Previous Investigations***

Multiple field surveys and investigations have been conducted for both basins. Field surveys for the LSCB did not indicate the presence of archaeological or historical resources. However, USCB contains a deteriorated homestead ranch complex, formerly occupied by the Sullenger Family, in the southwest portion of the project area (Photos 9 and 10, Figure 1). The homestead ranch consists of a two-story ranch house that was built sometime in the 1880s, a shed, carriage house or garage, 80-year old barn, a blacksmith's shop, and a privy; the barn, carriage house, and privy have collapsed.



Photo 9: Two-story Sullenger ranch house built ca. 1880.



Photo 10: Blacksmith shop building in front with Sullenger ranch house in background.

In 1993, when the Flood Control District acquired the property for construction of the interim basin, the entire project area was surveyed and no prehistoric sites were located. The Sullenger Ranch complex, an example of a historic homestead dating from the late 19<sup>th</sup> to the mid-20<sup>th</sup> century, was evaluated in accordance to criteria of importance as defined by California Environmental Quality Act (CEQA) and determined potentially significant under CEQA. Further investigations in 2008 included archaeological testing and data recovery of the complex to assess and document historic structures and subsurface features associated with the complex. The archaeological testing and data recovery revealed five subsurface features (primarily domestic items associated with food preparation, tableware, clothing, building materials as well as farming items) that were evaluated and determined not eligible for listing in the CRHR, but the historic structures were recommended as eligible for listing in the CRHR, as the site met two of the eligibility criteria.

Further evaluations were conducted in 2010, which included an updated records search, consultations with the NAHC and interested Native American representatives, preparation of a geoarchaeological assessment of potential buried resources, additional historic research and the preparation of a historic context and recordation of the Sullenger Ranch, and CRHR eligibility assessment of archaeological potential and structures that constitute the Sullenger Ranch.

The geoarchaeological assessment evaluated the potential for buried cultural resources which included evaluation of data obtained from previous soil borings and test pit excavations. The

assessment revealed that based on the soils and buried sediments within the project area there is low or moderate-low sensitivity for prehistoric archaeological deposits over most of the project area. The area of the existing basin has already been excavated to depths below the possibility for any archaeological deposits and this area was determined to have low archaeological sensitivity. Although, the soil types in proximity to the creek, are considered to have moderate archaeological sensitivity, and in part lie on top of “younger terrace deposits” that could yield archaeological deposits. Therefore, the creek area is considered to have moderate archaeological sensitivity from the surface to the base of the “younger terrace deposits” and to the top of the underlying “older terrace deposits” or the bedrock, depending on location.

## IMPACT DISCUSSION

- a) *Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?*

No evidence of an earlier farmhouse or other historical structures were discovered during the field survey of LSCB. USCB contains a deteriorated homestead ranch complex, formerly occupied by the Sullenger Family. Re-evaluation of the Sullenger Ranch complex structures determined that the Sullenger Ranch does not meet the eligibility criteria for listing on the California Register as neither the buildings or the recovered archaeological deposits retain sufficient integrity to be eligible for listing. While the Sullenger Ranch buildings are not considered eligible for listing on the CRHR, the collected artifacts will be offered to interested local historical societies to expand their existing collection of the local history. Therefore, project impacts will be **less than significant**.

- b) *Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?*

No surface evidence of prehistoric archaeological resources was encountered during the field survey of LSCB. In addition, no evidence of an earlier farmhouse, other structures or historic archaeological features and resources was observed.

The geoarchaeological assessment at USCB concluded that areas within the existing basin are not likely to reveal archaeological resources as the area of the existing basin has already been excavated to depths below the possibility for any archaeological deposits and therefore this area was determined to have low archaeological sensitivity. However, the creek area, including the Sullenger Ranch, has a moderate sensitivity for archaeological resources. The proposed plan for cutting and filling within and around the creek area is complex due to the existing topography and the plan to recreate a natural looking creek through the expanded basin. Much of the creek area will be cut to depths over 11 feet below ground surface, removing all of the soil types that yield moderately sensitive deposits, and in some of the areas where the cut will be less than 11 feet, the excavation will still be deep enough to remove all of the moderately sensitive deposits. Although there is no evidence for prehistoric archaeological deposits either on the surface or in the large number of geotechnical pits and bore holes that have been excavated within the project area (including the creek area), there is some possibility that buried prehistoric archaeological resources might be encountered in the vicinity of the creek.

While no archaeological resources were identified during surveys of both basins, there is the possibility of encountering cultural resources during subsurface activities. Based on the geoarchaeological assessment results for USCB, subsurface activities in the creek area will be monitored by a qualified archaeologist. In the event that archaeological resources are

discovered at either basin, project specifications direct the contractor to halt subsurface activities in the general vicinity and to immediately notify the Flood Control District. The Flood Control District will immediately consult with a qualified archaeologist to evaluate the resource(s) and provide a management plan consistent with CEQA and Contra Costa County cultural resources protection requirements. Therefore, project impacts will be **less than significant**.

- c) *Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?*

Based on field surveys and subsurface investigations conducted by qualified archaeologists, no unique paleontological resources or geologic feature were discovered at USCB or LSCB. As indicated above, while no paleontological or unique geological feature was identified, there is the possibility of encountering these resources during subsurface activities. In the event that either of these resources is discovered, project specifications direct the contractor to halt subsurface activities in the general vicinity and to immediately notify the Flood Control District. The Flood Control District will immediately consult with a qualified archaeologist to evaluate the resource(s) and provide a management plan consistent with CEQA. Therefore, project impacts will be **less than significant**.

- d) *Would the project disturb any human remains, including those interred outside of formal cemeteries?*

No formal cemeteries are present within or adjacent to either the USCB or LSCB. The NAHC was contacted to determine if there are any recorded Native American burial grounds and/or sacred land sites in the project vicinity. The NAHC reported that no recorded sites occur in the vicinity of the basins. In order to determine if there are any unrecorded burial grounds and/or sacred land sites in the vicinity of either basin, a list of Native American representatives for the region was provided. The listed Native American representatives were notified of the project via certified mail and follow up emails and/or phone calls. Responses were received from the local Native American representatives who did not have specific knowledge of Native American sites within or near the basins, however, they requested that subsurface activities within the creek areas be monitored by a qualified archaeologist due to a higher potential of encountering Native American resources. Because there is a potential for cultural resources to be encountered during subsurface activities in the vicinity of the creek, an archaeological monitor will be present during subsurface activities that occur in the creek area.

In the event Native American resources are discovered, project specifications direct the contractor to halt subsurface activities in the general vicinity and to immediately notify the Flood Control District. The Flood Control District will immediately consult with a qualified archaeologist to evaluate the resource(s) and provide a management plan consistent with CEQA. Further, if human remains are discovered, the Flood Control District will notify the County Coroner, NAHC, and local Native American representatives to determine the extent of the remains in accordance to the California Health and Safety Code (Health and Safety Code Section 7050.5[b]). Therefore, project impacts will be **less than significant**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>VI. GEOLOGY AND SOILS</b>				
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Be located on a geological unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### ***Environmental Setting***

A geotechnical investigation was conducted of both basins to document subsurface geotechnical conditions, provide analysis of anticipated site conditions as they pertain to the project, and to recommend design and construction criteria as well as to establish a geotechnical baseline that may be used to assess changed conditions that may be encountered during construction.

### *Seismic Hazards*

Contra Costa County is located within a region of high seismicity; the San Francisco Bay Region has been impacted by severe earthquakes during historic time. In order to provide safety of structures for human occupancy, the Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazards. This state law was a direct result of the 1971 San Fernando Earthquake, which was associated with extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures. Surface rupture is the most easily avoided seismic hazard. The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones) around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning and controlling new or renewed construction (Contra Costa County 2005e).

For design of non-critical structures, active faults are defined those with Holocene seismic activity (past 10,000 years). This definition is used to 1) establish the Alquist-Priolo Special Study Zone for fault rupture hazard studies, and 2) develop seismic design criteria for dynamic analysis and seismic design of structures (Fugro West 2003, 2004).

Approval of the design and operation of the basin falls under the jurisdiction of the California Department of Water Resources, Division of Safety of Dams (DSOD) (Fugro West 2004). The DSOD defines active faults as those with late Pleistocene seismic activity (past 35,000 years). DSOD defines quaternary active faults (faults with activity within the last 1.6 million years) with insufficient proof of inactivity within the late Pleistocene activity as potentially (conditionally) active faults. According to DSOD's guidelines, all active or potentially (conditionally) active faults should be considered during seismic studies related to dams safety (Fugro West 2003, 2004).

Two local potentially seismic faults occur in the Antioch and Brentwood area. The Antioch-Davis fault is mapped as crossing the western portion of the USCB site. This fault was originally classified as an Alquist-Priolo Earthquake Fault Zoning Act fault by the California Geologic Survey; however the fault has been re-evaluated and dezoned on the basis of a lack of evidence for Holocene activity (GEI 2009). The Antioch-Davis fault is not considered an active structure that could pose a surface rupture or earthquake source hazard to the basins. However, other possible issues related to the fault which will be considered in the design are the potential for differential settlement or localized weak foundation materials within the fault zone, and possible seepage or piping along bedrock faults and fractures (GEI 2009). The Antioch-Davis fault is located approximately 1.2 miles west of the LSCB site. The Brentwood-Sherman Island Fault is located closer to the LSCB, approximately 2 miles east of the Antioch-Davis fault and is considered potentially active for planning purposes (City of Brentwood 2009d).

Other known nearby mapped major faults include the Great Valley fault located approximately 8 miles to the southwest, the Greenville fault located approximately 6 miles to the southwest, the Mt. Diablo Blind Thrust located approximately 7 miles to the southwest, the Concord-Green Valley fault located approximately 12 miles to the east, the Calaveras fault located approximately 7 miles to the south, the Hayward fault located approximately 25 miles to the southwest, and the San Andreas fault located approximately 43 miles to the southwest. Each of these faults has had a maximum magnitude episode over 6.0 (Fugro 2004).

### *Geology*

The general geology of both basins consists of Quaternary Alluvium, consolidated and unconsolidated sediments. Localized problems for construction include expansive clays, hillside earthflows, and unstable cut slopes (Contra Costa County 2005e, Figure 10-1). From the perspective of seismic safety planning, the older, coarser, and well-drained geological materials

tend to be stable during earthquakes, while the younger, fine-grained and water-saturated deposits tend to be less stable (Contra Costa County 2005d).

Specifically, the USCB is located in Lone Valley which consists of quaternary alluvial fan deposits and recent alluvium overlying Markley Sandstone. Most of the project area will be excavated in the alluvial fan deposits. Other geological features mapped in the project vicinity include landslide deposits within the sandstone ridge near the southeast corner of the basin. The groundwater table ranges between 21 and 26 feet below ground surface (Fugro West 2004).

The LSCB site is located east of Lone Tree Valley which also consists of quaternary alluvial fan deposits. Subsurface conditions consists of up to 200 feet of Quaternary alluvium (clay, sand, and gravel) overlying Pliocene Non-Marine Sediments. The groundwater table occurs between 10 to 25 feet below ground surface (Fugro West 2003).

### *Soils*

At USCB there are four mapped soil units in and adjacent to the project area: Altamont-Fontana Complex, 30 to 50 percent slopes; Capay Clay, 0 to 2 percent slopes; Pescadero clay loam; and Rincon clay loam, 0 to 2 percent slopes. The Altamont Series consists of well-drained soils underlain by shale and soft, fine-grained sandstone. These soils are on foothills north and east of Mount Diablo. Slopes are 9 to 75 percent. Permeability is slow. Where the soil is bare, runoff is medium to rapid and the hazard of erosion is moderate to high. The Capay Series consists of moderately well-drained soils formed in alluvium from sedimentary rock. These soils are on lower edges of valley fill and on old benches that have been slowly dissected. Slopes are 0-9 percent. Permeability is slow with very slow surface water runoff, minimal hazard of erosion, and high shrink-swell potential. Pescadero Series consists of poorly-drained soils that formed in alluvium from sedimentary rock. These soils are in small inland valleys on rims of basins. Slopes are 0 to 2 percent. Permeability is slow with very slow surface water runoff. There is no hazard of erosion where the soil is tilted and exposed. Rincon Series consists of well-drained soils mainly on benches. These soils formed in alluvial valley fill from sedimentary rock. Slopes are 0 to 15 percent. Permeability is slow with slow surface water runoff. The hazard of erosion is none to slight where the soil is tilled and exposed (NRCS 1977).

On-site subsurface explorations at USCB indicate that subsurface conditions generally consist of lean clay and sandy lean clay with interbedded layers of clayey and silty sand. Isolated lenses of poorly graded sand, and poorly graded sand with silt and clay were encountered. The different soil layers were grouped into three units: 1) lean clay, 2) interbedded sandy clay/sandy silt, and 3) clayey and silty sands. In general, the upper lean clay consists of stiff to hard sandy lean clay and lean clay within the upper 15 feet. The interbedded layers of sandy clay/sandy silt underlie the upper lean clay and consists of medium dense to dense clayey sand and medium stiff to stiff lean clay that extends to a depth of approximately 35 feet. Discontinuous lenses of loose sand, silty sand, and sandy silt are found within the interbedded unit. The lower lean clay underlies the interbedded sandy clay/sandy silt layer and generally consists of very stiff to hard lean clay and sandy lean clay and extends to the depths explored. Sandstone bedrock is anticipated to be located at a depth of approximately 8 to 25 feet below the proposed basin bottom (Fugro West 2004).

The LSCB site is underlain by Sycamore silty clay loam. This soil type consists of grayish-brown silty, clayey, loam extending to a depth of 15 inches. These soils are characterized as having moderately slow permeability; risk of soil blowing and water erosion is slight (NRCS 1977).

On-site subsurface explorations at LSCB indicate that the subsurface conditions generally consists of lean clay, sandy lean clay, clayey sand, and interbedded layers of sandy clay and sandy silt. Isolated lenses of poorly graded sand, silty sand, and poorly graded sand with silt and clay were encountered. The different soil layers were grouped into four units: 1) upper lean clay, 2) interbedded sandy clay/sandy silt, 3) sand, and 4) lower lean clay. In general, the upper lean clay consists of stiff to hard sandy lean clay and lean clay within the upper 15 feet of the basin. The interbedded layers of sandy clay/sandy silt underlies the upper lean clay and consists of medium dense to dense clayey sand and medium stiff to stiff lean clay that extends to a depth of approximately 35 feet. Discontinuous lenses of loose sand, silty sand, and sandy silt (sand unit) are found within the interbedded unit. The lower lean clay underlies the interbedded sandy clay/sandy silt layer and generally consists of very stiff to hard lean clay and sandy lean clay and extends to the depths explored (Fugro West 2003).

USCB will be expanded from approximately 41 acres to 62 acres, increasing its flood storage capacity from 123-acre feet to approximately 900-acre feet (35-foot maximum depth). The basin floor is at approximately 175 feet elevation. The basin will have multiple levels of excavation. Excavation depths will range from 0 to approximately 60 feet below existing grade resulting in basin elevations ranging from 158 feet above mean sea level in the lowest tier of the basin floor to 195 feet at the basin's perimeter. The lowest (southern) tier will include Sand Creek; approximately 3,876 feet of Sand Creek will be excavated 10 feet below its current elevation and reconstructed with a geomorphic creek design to restore and enhance Sand Creek within the basin.

The LSCB will be expanded from approximately 19 acres to 23 acres, increasing its flood storage capacity from 40-acre feet to 300-acre feet (22-foot maximum depth). The basin floor is at approximately 98 feet elevation. Similar to USCB, the basin will have multiple levels of excavation. Excavation depths will range from 4 to 23.5 feet below existing grade resulting in basin elevations ranging from 88 feet in the lowest (northern) tier of the basin floor to 110 feet at the basin's perimeter. The basin expansion extends north of Sand Creek. The lowest (northern) tier will include Sand Creek; approximately 1,100 feet of Sand Creek will be excavated and reconstructed with a mitigation wetland area within the expanded basin.

## IMPACT DISCUSSION

- a) *Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death, involving:*
  - i) *Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?*

Both basins are located in a seismically active area of the San Francisco Bay Area. While the Antioch-Davis fault has been determined as an inactive fault and the Brentwood-Sherman fault is considered as potentially active for planning purposes, nearby faults associated with the San Andreas Fault system have the potential to affect the integrity of the basins. Recommendations from the geotechnical investigations in accordance with the DSOD design guidelines and local design practice will be incorporated into the project contract specifications to ensure that the expanded basins will withstand seismic activity to prevent flooding of downstream communities. Therefore, project impacts will be **less than significant**.

*ii) Strong seismic ground shaking?*

While the project area is located within an area of moderately low damage susceptibility to seismic ground shaking (Contra Costa County 2005e, Figure 10-4), as discussed above, the project area is located in a seismically active region of California and therefore earthquakes occurring along the other faults in the region have the potential to produce strong groundshaking at both sites. For this reason, the outlet structures and earth embankments will be designed to resist the forces generated by earthquake shaking, in accordance with DSOD design guidelines and local design practice to ensure that the expanded basins will withstand seismic activity to prevent flooding of downstream communities (Fugro West 2004). Therefore, project impacts will be **less than significant**.

*iii) Seismic-related ground failure, including liquefaction?*

Soil liquefaction is a phenomenon primarily associated with saturated, cohesionless soils located close to the ground surface, normally within the upper 50 feet. These soils lose strength during cyclic loading, such as that induced by earthquakes. During the loss of strength, the soil acquires “mobility” sufficient to permit both horizontal and vertical movements. Clean, loose, uniformly-graded, saturated, fine-grained sand is most susceptible to soil liquefaction (Fugro West 2004).

Soils in both basins have generally a moderate to low susceptibility for seismic-related ground failure including liquefaction (Contra Costa County 2005e, Figure 10-5; Fugro West 2003, 2004). The subsurface soil data within both basins consist of alternating layers of lean clay, sandy lean clay, and clayey sand. In general, clayey soils are typically not susceptible to soil liquefaction. The sandier soils are typically loose to medium dense and are susceptible to soil liquefaction. The liquefiable layers within the project area are typically interbedded with non-liquefiable soils and appear to be confined to former channels of Sand Creek. Therefore, the risk of occurrence of widespread liquefaction is judged to be low. However, localized soil liquefaction may occur, but the magnitude of liquefaction-induced settlement is anticipated to be low, likely less than 5 inches for both basins (Fugro West 2003, 2004).

The project design and construction will incorporate recommended measures in accordance with local design practice and DSOD design guidelines to ensure that the expanded basins will withstand seismic activity to prevent flooding of downstream communities. Therefore, project impacts will be **less than significant**.

*iv) Landslides?*

The major geological hazards aside from earthquake rupture and direct effects of ground shaking are unstable slopes, reclaimed wetlands, and marsh fill areas. Slopes may suffer landslides, slumping, soil slips, and rockslides. Reclaimed wetlands, whether filled or not, experience amplified lateral and vertical movements which can be damaging to structures, utilities, and transportation routes and facilities (Contra Costa County 2005e, page 10-21). General Plans historically have recognized that major slope areas in excess of 26 percent are “not readily developable” and “undevelopable”, recognizing the cost and engineering difficulties of grading steep slopes as well as their inherent unsuitability (Contra Costa County 2005e, page 10-22).

The LSCB site does not contain geomorphic expressions of landslides and subsurface explorations did not encounter loose and/or disturbed materials or distinct planes that would

indicate presence of a landslide (Fugro West 2003). However, the USCB site contains a deep-seated ancient bedrock landslide that exists on the hillslope above the east (right) abutment of the proposed main dam. This slide has been substantially modified by erosion, and the toe has been cut and buttressed by a portion of the alluvial terrace. The terrace is undeformed by the slide, and shows that this slide has not been active for many thousands of years. Further investigation of the ancient landslide did not show evidence of recent-appearing movement and is partly “healed” and probably less susceptible to sliding displacements than at the time of initial movement. In addition, numerous smaller and shallower, more active landslides are present in the hillslope above Sand Creek in the area of the proposed cut slopes bounding the margin of the basin. These slides include shallow gullies, rotational slumps, and transitional slides in colluvial soils and stream terrace deposits that are about 5 to 15 feet deep, slumps/slides in weathered bedrock that are about 15 to 25 feet deep and typically toe-out in the creek channel, and areas of shallow raveling in steep bedrock cuts and slopes adjacent to the creek channel, partly in response to creek incision (GEI 2009).

As part of the final design, further investigations will be made of the slide area to confirm or refine the findings (GEI 2009). The project design and construction will incorporate recommended measures in accordance with DSOD guidelines and local design practice to ensure that the expanded basins will withstand seismic activity to prevent flooding of downstream communities. Therefore, project impacts will be **less than significant**.

*b) Would the project result in substantial soil erosion or the loss of topsoil?*

Major grading and excavation will result in some changes in topography associated with the basin expansion which will include temporary loss of topsoil and the potential for soil erosion from wind and stream flows. The Flood Control District will notify the cities of Antioch and Brentwood to determine if a grading permit is required. Standard project contract specifications will require adherence to standard dust control and erosion control practices during construction, including, but not limited to, general watering of exposed areas and/or use of chemical stabilizers during construction. In order to minimize potential erosion due to general watering during construction activities, project contract specifications will also require the contractor to implement appropriate watering levels and duration. Permanent rock slope protection will be placed at the inlets and outfalls to minimize exposure of bare soils to stream flows. Upon project completion, all areas left exposed will be re-seeded and re-vegetated with native species appropriate to the area in order to stabilize exposed soil. In addition, because the disturbed area will exceed one acre, the Flood Control District will obtain a Stormwater Construction General Permit from the State Water Resources Control Board which requires that the contractor prepare a Storm Water Pollution Prevent Plan (SWPPP) which will identify appropriate erosion control measures that will be implemented, after the Flood Control District's approval. Therefore, project impacts will be **less than significant**.

*c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?*

See discussion under item **a** above. Project impacts will be **less than significant**.

- d) *Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?*

Expansive soils swell when they absorb water and shrink as they dry. The basic cause of expansion is the attraction and absorption of water in the expandable crystal structures of clays. These areas must be recognized because they can cause cracking to foundations during wet or dry periods. Moreover, various portions of a structure may become distorted, such that doors and windows do not function properly. These hazards can be avoided through proper drainage and foundation design. The California Uniform Building Code (UBC) has incorporated standard response spectra as a basis for structural design and established minimum standards. The UBC considers primary lateral seismic forces and general soil type (City of Antioch 2003). If expansive soils are recognized through appropriate soils testing, corrective measures can be designed into the foundations.

Both basins are located on alluvial soils primarily consisting of stiff to hard clay of medium to high plasticity, which are likely to have moderate to high shrink-swell potential (GEI 2009). The project design and construction will incorporate recommended measures in accordance with DSOD design guidelines and local design practice to ensure that the embankments of the expanded basins are constructed with soil types that are not susceptible to cracking caused by differential settlement. Therefore, project impacts will be **less than significant**.

- e) *Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?*

Septic tanks and alternative wastewater disposal systems are not part of the project. Therefore, the project will have **no impact**.

ISSUES:	Potentially Significant Impact	Less Than Significant	Less Than Significant Impact	No Impact
		With Mitigation Incorporated		

## VII. GREENHOUSE GAS EMISSIONS

Would the project:

- |  |                          |                          |                                     |                          |
|--|--------------------------|--------------------------|-------------------------------------|--------------------------|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?      | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time (Office of Planning and Research [OPR] 2008). There is a general scientific consensus that global climate change is occurring, caused in whole or in part by increased emissions of greenhouse gases (GHGs) that keep the earth's surface warm by trapping heat in the atmosphere. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land (OPR 2008). GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, respectively (LSA 2009). The major GHGs that are released from human activity include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxides (NO<sub>x</sub>). The primary sources of GHGs are vehicles (including planes and trains), energy plants, and industrial and agricultural activities (such as dairies) (OPR 2008).

Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, recognized that California is the source of substantial amounts of GHG emissions which poses a serious threat to the economic well-being, public health, natural resources, and the environment of California (OPR 2008). Potential adverse impacts of global warming include severe air quality problems, a reduction in the quality and supply of water from the Sierra snowpack, a rise in sea levels causing the displacement of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems (Health and Safety Code, section 38501) (OPR 2008). Other potential threats include increased heat and ozone days, forest fires, and droughts (LSA 2009). In order to avoid these consequences, AB 32 established a state goal of reducing GHG emissions to 1990 levels by the year 2020 (a reduction of approximately 25 percent from forecast emission levels) with further reductions to follow.

In order to address global climate change associated with air quality impacts, CEQA statutes were amended to require evaluation of greenhouse gas (GHG) emissions (global pollutants) which includes criteria air pollutants (regional pollutants) and toxic air contaminants (local pollutants). As a result, the BAAQMD adopted CEQA thresholds of significance for criteria air pollutants and GHGs, and issued updated CEQA guidelines to assist lead agencies in evaluating air quality

impacts to determine if a project's individual emissions would be cumulatively considerable. Various modeling tools are used to estimate emissions based on the type of project (i.e., land use developments, linear transportation and utility projects) (BAAQMD 2010a).

a) *Would the project generate greenhouse gas emissions either directly or indirectly, that may have a significant impact on the environment?*

The expanded flood control basins would not generate an increase of air pollutant concentrations. However, construction of the basins would result in temporary increases of air pollutant concentrations from construction equipment and off-haul truck exhaust (criteria air pollutants) and soil excavations (PM dust). The project consists of excavating approximately 62 acres of the existing and expansion areas at USCB which would require the movement of approximately 420,000 cubic yards of soil. Approximately 105,000 cubic yards will be used on-site for construction of the "fill" dam; 40,000 cubic yards will be left on-site or on adjacent properties, and 110,200 cubic yards will be hauled away to nearby projects within a 10-mile radius (i.e., Highway 4/Loveridge Road Expansion in Antioch, Sand Creek Interchange in Brentwood). Construction is currently planned for 2011 and will take approximately six months to complete.

Approximately 249,000 cubic yards of soil will be excavated from LSCB of which approximately 47,000 cubic yards will be used on-site, leaving approximately 202,000 cubic yards that will be hauled away or used for the adjacent City of Brentwood parcel that is planned for a future park and/or nearby projects in need of soil within a 20-mile radius. Construction is currently planned for 2016 and will take approximately six months to complete.

While the BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions, the Lead Agency should quantify and disclose GHG emissions that would occur during construction. Sources of construction-related GHGs only include exhaust (carbon dioxide, nitrous oxide) for which the same detailed guidance as described for criteria air pollutants and precursors should be followed. As discussed in the Air Quality section, the project did not meet the BAAQMD preliminary screening criteria due to the extent of soil movement and transport. Therefore, estimated construction emissions were quantified using the URBEMIS model (2007 version 9.2.4) to determine if project-related construction emissions exceed the BAAQMD daily significance thresholds (LSA 2010). As shown in Table 2 in the Air Quality section, neither basin expansions will exceed the daily significance thresholds. However, the BAAQMD recommends the implementation of all *Basic Construction Mitigation Measures* as listed in Table 8-2 of the BAAQMD CEQA Guidelines whether not construction-related emissions exceed applicable thresholds of significance. Therefore, the project will implement the following applicable air pollution control measures:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) will be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site will be covered.
- All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. Dry power sweeping will not be used.
- All vehicle speeds on unpaved roads will be limited to 15 mph.
- Idling times will be minimized by either shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. Clear signage will be provided for construction workers at all access points.

- All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- Signs will be posted with the telephone number and person to contact regarding dust complaints. Complaints will be corrected within 48 hours. The sign will also include the BAAQMD phone number to ensure compliance.

Implementation of the above-listed air pollution control measures will not generate direct or indirect significant GHG emissions. Therefore, project impacts will be **less than significant**.

*b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

As discussed above and in the Air Quality section, implementation of the air pollution control measures will minimize air quality impacts which are consistent with the BAAQMD air quality plans on achieving GHG reductions. Therefore, project impacts will be **less than significant**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>VIII. HAZARDS AND HAZARDOUS MATERIALS</b>				
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

### **Regulatory Background**

A material is considered hazardous if it appears on a list of hazardous materials prepared by a Federal, State, or local agency, or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined in Section 66261.10, Title 22 of the California Code of Regulations (CCR) as follows:

*A substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed.*

Chemical and physical properties cause a substance to be considered hazardous. Such properties include toxicity, ignitability, corrosivity, and reactivity. CCR, Title 22, Sections 66261.20-66261.24 define the aforementioned properties. The release of hazardous materials into the environment could potentially contaminate soils, surface water, and groundwater supplies. Under Government Code Section 65962.5, the California Department of Toxic Substances Control (DTSC) maintains a list of hazardous substance sites. This list, referred to as the "Cortese List," includes CALSITE hazardous material sites, sites with leaking underground storage tanks, and landfills with evidence of groundwater contamination.

Numerous Federal and State agencies regulate hazardous materials and waste such as the Environmental Protection Agency, DTSC, and California Department of Health Services. However, depending on the waste, the California Air Resources Board or the State Water Resources Control Board or another agency may also be involved. Locally, the Contra Costa Health Services, Hazardous Materials Program (CCHS-HMP) serves area residents by responding to emergencies and monitoring hazardous materials.

### **Environmental Setting**

USCB and surrounding vicinity has been used for cultivation of grain and production of hay since the late 1800s (Leighton 2001). However, in recent years the project area vicinity has been left vacant and used only for cattle grazing. An abandoned gas well was present on the northern side of the existing basin (SCI 2000). A CALPINE natural gas line and associated easement extends in an east-west direction along the northern boundary of the project area.

LSCB and surrounding vicinity has been used for agricultural production since at least 1917. In 1917, an agreement was signed providing right-of-way to the East Contra Costa Irrigation Company along Sand Creek, an area including LSCB. At that time, LSCB was a small portion of the "Brentwood Irrigated Farms". Historic aerial photographs showed a house and garage within

LSCB adjacent to Sand Creek surrounded by orchards from 1957 to 1980s when the orchards were removed and replaced with row crops and remained until at least the 1990s. A second house and an agricultural building were situated approximately 700 feet west of LSCB (SCI 2002).

USCB contained one oil and gas exploration well along the northern boundary of the proposed expansion area that was closed in 1993. While LSCB did not contain oil and gas exploration wells, there were two wells near the western boundary of LSCB, but these wells did not encounter oil or gas and have been plugged and abandoned (SCI 2000).

### ***Previous Investigations***

Due to the agricultural historic use of both basins, chemicals such as fungicides, insecticides, and herbicides have the potential to be present within the soils on-site as some of the chemicals can leave residues that persist in soils for 30 years or more (Baseline 1995). Subsurface investigations were conducted prior to construction of the interim basins to determine if agricultural chemicals as well as hydrocarbons within the diesel and motor ranges are present within the soils on-site.

Subsurface investigations of both basins consisted of collecting a range of soil samples from 0 to 15 feet below ground surface. No groundwater was encountered in any of the soil borings. Analytical results indicated low levels of hydrocarbons, metals, and pesticides. Based on these results, it does not appear that soils within the proposed basin expansion areas have been significantly impacted from previous uses (SCI 2000, SCI 2002).

## **IMPACT DISCUSSION**

- a) *Would the project create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?*

Once constructed, the expanded flood control basins would not result in routine transport, use or disposal of hazardous materials. However, there is the potential for a release of hazardous substances from construction equipment operations (e.g., accidental petroleum spills) during construction. Project contract specifications will require that the contractor prepare a site-specific Stormwater Pollution Prevention Plan (SWPPP) as required by the Stormwater Construction General Permit to identify safety and best management practices (e.g., placement of drip pans under stationary equipment, routine equipment inspections, and having on-site spill cleanup materials) to prevent accidental releases of hazardous substances and potential worker exposure. In addition, project contract specifications will also require the contractor to contact Underground Service Alert (USA) prior to conducting any work that could potentially impact utilities. Therefore, project impacts will be **less than significant**.

- b) *Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

As discussed above, once constructed, the expanded flood control basins would not use or store hazardous materials that would create a significant hazard to the public or the environment. However, there is the potential for a release of hazardous substances from construction equipment operations (e.g., accidental petroleum spills) during construction. The required preventative measures discussed above will minimize potential impacts to the environment and worker exposure. The CALPINE-owned natural gas line that borders the northern boundary will be identified by Underground Service Alert (USA) and avoided. Therefore, project impacts will be **less than significant**.

- c) *Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?*

Schools are located within one-quarter mile for both USCB and LSCB. There is one school located approximately one-quarter mile north of USCB and an elementary school located within one-quarter mile south of LSCB. The expanded flood control basins would not emit hazardous emissions or handle hazardous materials, substances, or waste. While construction equipment exhaust would generate an increase in air pollutant concentrations, it would be temporary and effects would be negligible due to implementation of air pollution control measures and wind patterns in this area of East County (see Air Quality section). Therefore, project impacts will be **less than significant**.

- d) *Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?*

The project area and surrounding properties were not identified on any lists maintained by the California Environmental Protection Agency (EPA), California Department of Toxic Substance Control (DTSC), or Contra Costa Health Services, Hazardous Materials Program (CCHS-HMP) databases available on their websites (DTSC, EPA, CCHS-HMP 2010). As previously discussed in this section, soil sampling analysis results indicate that the residual petroleum hydrocarbon, metals, and agricultural chemical constituents within the soil at both basins have not been significantly impacted and would not pose an unacceptable human health or ecological risk (SCI 2000, 2002). The deteriorated Sullenger Ranch buildings at USCB contain trash which could contain unknown hazardous substances. The buildings will be removed prior to start of excavation activities. During removal of the buildings, any hazardous substances found will be handled and disposed of properly. Further, any evidence of soil staining or presence of hazardous substance storage will be investigated by a qualified contractor to determine the extent of contamination. Appropriate local and state agencies will be notified of the results and will be remediated under their direction. Therefore, project impacts will be **less than significant**.

- e) *For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project result in a safety hazard for people residing or working in the project area?*

Neither the USCB nor LSCB is located within two miles of a public airport. Therefore, the project will have **no impact**.

- f) *For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?*

Neither the USCB nor LSCB is located in the vicinity of a private airstrip. Therefore, the project will have **no impact**.

- g) *Would the project impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?*

The majority of the work would occur within the existing flood control basins during construction. Access to and from both basins would be properly maintained with appropriate traffic control measures and would not require street closures to ensure that moving emergency vehicles are not impacted. Therefore, project impacts will be **less than significant**.

- h) Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?*

The surrounding area consists of undeveloped grasslands at USCB and residential developments at LSCB. While the California Department of Forestry Hazard Severity Zones map (2006) identifies both basins within a moderate fire hazard zone, the project does not consist of development of structures that would expose people or structures to a significant loss, injury, or death from wildland fires as the purpose of the project is to provide flood control improvements to existing flood control basins. Further, safety and best management practices required for construction of the project will identify proper protocol should a fire occur. Therefore, project impacts will be **less than significant**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>IX. HYDROLOGY AND WATER QUALITY</b>				
Would the project:				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Place housing within a 100-year floodplain hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

<b>ISSUES:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
j) Inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

### ***Environmental Setting***

#### ***Hydrology***

Hydrology within the basin is influenced by many factors such as precipitation, run-off, geologic stratigraphy, topography, soil permeability, and plant cover. The mean annual rainfall varies from 20 inches a year at the higher elevation to 12 inches a year at the lowest elevation (Flood Control District 2008). Sand Creek is the largest tributary in the lower Marsh Creek Watershed as it contributes approximately 15 square miles of drainage to Marsh Creek (Flood Control District 2008). The primary goal of both basins is to prevent flooding along the lower reach of Marsh Creek between Sand Creek and the Marsh Creek outfall point into the Sacramento-San Joaquin River at Big Break in Oakley (Flood Control District 1992). The regional goal for USCB and LSCB is to attenuate peak flows from Sand Creek into Marsh Creek to 400 cubic feet per second for a 100-year storm event. Analyses of the Sand Creek drainage area indicate that 900-acre feet and 300-acre feet of flood storage capacity are ultimately required at the USCB and LSCB sites, respectively. The stormwater generated in the watershed will be conveyed by Sand Creek to the two basins where it will be stored and released slowly through the basin outlet pipes, reducing peak flows downstream and reducing the potential for flooding downstream properties (Flood Control District 2008).

Sand Creek is primarily an intermittent stream with the exception of segments within urbanized areas that receive urban runoff from nearby developments primarily throughout the year.

#### ***Water Quality***

The quality of surface water and groundwater in the vicinity of the project area is affected by past and current land uses at the site and within the watershed, and the composition of geologic materials in the vicinity. The State Water Resources Control Board and the Regional Water Quality Control Boards regulate water quality in surface and groundwater bodies. Both basins are under the jurisdiction of the Central Valley Regional Water Quality Control Board (RWQCB), which is responsible for the implementation of state and federal water quality protection statutes and regulations in the Delta area. The RWQCB implements the Water Quality Control Plan (Basin Plan), a policy document for managing water quality issues in the region (RWQCB 2007). The Basin Plan establishes beneficial water uses for waterways and water bodies within the region.

The water quality in the Marsh Creek watershed has been historically degraded by mercury and coal mining, extensive agriculture operations, oil and gas production, and urbanization. Marsh Creek Reservoir (located approximately 2 miles south of the project area) has been closed to fishing since the mid-1980s due to high concentrations of mercury found in fish both in and upstream of the reservoir. Discharges of wastewater from oil/water separation processes, as part of production oil fields, to Sand Creek have commonly occurred. Historic coal mining to the west at the Black Diamond Mines Regional Preserves, an East Bay Regional Parks District facility, includes mine tunnels and shafts below the regional groundwater table that has been discharging acid mine leachate into a tributary of Sand Creek. Efforts have been made to seal up the seep. These past activities have likely affected water quality in many of the creeks within the watershed (City of Antioch 2002).

### ***Flood Hazard Areas***

#### ***100-year Floodplains***

The Federal Emergency Management Agency (FEMA) records are maintained as a means of determining flood insurance rates through the National Flood Insurance Program (NFIP) (Contra Costa County 2005e). Both basins are immediately adjacent to a designated 100-year floodplain zone (Sand Creek) as shown on the FEMA NFIP Flood Insurance Rate Map (FEMA 2009).

#### ***Levees and Dams***

Levee and dam failure can also cause flooding. Neither basin is located within nor in the vicinity of levee systems (Contra Costa County 2005f) or dams (ABAG 1995). However, construction of the basin expansions falls under the Division of Safety of Dams (DSOD) and therefore, will need to comply with DSOD dam construction guidelines. The Division of Safety of Dams (DSOD) was created in 1929 as a result of a catastrophic dam failure in southern California that killed more than 450 people, destroyed 900 houses and many bridges and roads, and swept away 24,000 acres of farmland. A state commission reported that the two-year old dam failed because it was ill-built in a geologically unstable site. A reservoir falls under the DSOD jurisdiction if the dam height is more than 6 feet and it impounds 50 acre-feet or more of water, or if the dam is 25 feet or higher and impounds more than 15 acre-feet of water, unless it is federally-owned or exempted under special provisions described in Sections 6004, 6025, or 6026 of the California Water Code. The DSOD reviews and approves plans and specifications for the design of dams and oversees their construction to insure compliance with the approved plans and specifications. In addition, DSOD engineers inspect over 1,200 dams on a yearly schedule to insure they are performing and are being maintained in a safe manner (California Department of Water Resources 2010). The Office of Emergency Services approves the maps and distributes them to local governments who in turn adopt emergency procedures for the evacuation and control of areas in the event of a dam failure (ABAG 2010).

## **IMPACT DISCUSSION**

### ***a) Would the project violate any water quality standards or waste discharge requirements?***

The expanded basins will function to treat stormwater runoff by facilitating the settling of sediment associated with stormwater runoff before it enters into Sand Creek. The basins will be normally dry reservoirs (except for low-flows) that will attenuate peak runoff by containing stormwater flows up to the 100-year storm event. During typical rains, the creek and local stormwater runoff flows will be carried through a low-flow channel and will discharge through the primary outlets. Creek flows that exceed the inlet-controlled discharge capacity of the outlet works from more severe storms will then pond in the basin and the basin stage will rise. After

the peak of the storm has passed, and once the creek flow becomes smaller than the outlet discharge, the water stored in the basin will be passively released back to Sand Creek.

Construction will occur during the dry season (May 1 to October 15) when the creek is usually dry or has low flows. Water quality objectives will be met through adherence to construction provisions, precautions, and stipulations as described in the National Pollution Discharge Elimination System (NPDES) permit that will be obtained under the Statewide General Permit for Discharges of Storm Water Associated with Construction Activity (Order No. 2009-0009 DWQ) (Stormwater Construction General Permit). In accordance with the provisions of the Stormwater Construction General Permit, the Flood Control District will require the contractor to prepare a Storm Water Pollution Prevention Plan (SWPPP) which will identify applicable water quality and erosion control best management practices (BMPs) that will reduce or minimize discharge of pollutants from construction activities as well as a revegetation and erosion control plan to ensure that all graded areas are revegetated prior to the onset of winter rains. The graded areas will be revegetated with native grasses appropriate to the area, and rock slope protection will be placed at the inlet and outlet structures.

The Flood Control District will also obtain permits from the Army Corps of Engineers (Corps) (Section 404 of the Clean Water Act) (U.S. Army Corps of Engineers 2010) , Central Valley Regional Water Quality Control Board (RWQCB) (Section 401 of the Clean Water Act) (CRWQCB 2010), California Department of Fish and Game (CDFG) (Section 1600 of the California Fish and Game Code) (CDFG 2010) for permanent and temporary impacts within Sand Creek). In addition, a dewatering plan will be prepared to identify the appropriate method of water diversion and will be provided to the CDFG for their review and approval if it differs from the typical upstream and downstream cofferdam design. As discussed in the Biological Resources section, permanent and temporary impacts to the creek and associated wetlands will be mitigated by payment of development and wetland impact fees to the East Contra Costa County HCP Conservancy and a plan to restore the creek within the basins in accordance to the HCP/NCCP to ensure that the impacted areas provide beneficial values than what currently exists. Therefore, project impacts will be **less than significant**.

- b) *Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

Based on previous field explorations, the groundwater table was measured at a depth of 21 to 26 feet below existing ground surface (160 to 165 feet elevation) at USCB. The existing basin floor is at approximately 175 feet elevation and will be excavated to 158 feet elevation (Fugro 2003). Therefore, excavation will extend to a depth roughly 1 to 5 feet above the groundwater table.

Groundwater occurs at a depth of 18 to 20 feet below ground surface (85.5 feet to 92 feet elevation) at LSCB. The existing basin floor is at approximately 98 feet elevation and will be excavated to 88 feet elevation (Fugro 2003). Therefore, excavation will extend to a depth of roughly 8 to 10 feet above the groundwater table.

While the basin expansions will not involve withdrawals from an aquifer or groundwater table, minor withdrawals may occur during construction as groundwater and/or saturated conditions may be encountered during excavation activities of the basin floor. Project contract

specifications will require the contractor to prepare a groundwater control plan to address how the groundwater will be removed from the work area and released. Dewatering may be accomplished with sumps or a more advanced groundwater control system, which will be designed by an experienced specialty contractor with experience in similar subsurface conditions. Therefore, project impacts will be **less than significant**.

- c) *Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site?*

As discussed in the Biological Resources section, both basin expansions will involve removal of portions of Sand Creek which will be recreated within each basin expansion area with the appropriate geomorphic and restoration design, which will also include wetland mitigation areas.

As construction of both basins will occur during the dry season (May 1-October 15), it may have a short-term impact on the turbidity of runoff in Sand Creek and the downstream reaches of Marsh Creek during the rainy season. The effects of sediment on the beneficial uses of Sand and Marsh Creeks could interfere with the activities of and physiological damage to aquatic species. In addition, construction-related pollutants such as oils, greases, and coatings from equipment operation and maintenance could enter the creek system, especially if large quantities are spilled near the creek. A dewatering plan will be prepared to identify the appropriate method of water diversion and will be provided to the CDFG for their review and approval if it differs from the typical upstream and downstream cofferdam design. Project contract specifications will direct the contractor to implement applicable BMPs to minimize water quality impacts. Therefore, project impacts will be **less than significant**.

- d) *Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?*

As discussed above, both basin expansions will involve removal of portions of Sand Creek which will be recreated within each expansion area with the appropriate geomorphic and restoration design, including a wetland mitigation area. However, the drainage pattern for each basin would not be substantially altered in that it would not result in on-site or off-site flooding as the basin expansions will store and release flows slowly through the basin outlet pipes, reducing peak flows downstream and reducing the potential for flooding downstream properties. Therefore, project impacts will be **less than significant**.

- e) *Would the project create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?*

The purpose of the basin expansions is to control increased urban runoff and reduce peak flows in Marsh Creek. As discussed above, the stormwater runoff will be stored and released slowly through basin outlets, reducing peak flows downstream. Pollutants associated with stormwater runoff would settle out prior to being discharged downstream into Sand Creek. However, as discussed in item a above, construction of the basin expansions may impact downstream water quality. Project contract specifications will direct the Contractor to implement applicable BMPs to minimize water quality impacts. Therefore, project impacts will be **less than significant**.

f) *Would the project otherwise substantially degrade water quality?*

No additional impacts other than those discussed under Items a, c and e above are anticipated. Therefore, project impacts will be **less than significant**.

g) *Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?*

While both basins will be located within a 100-year flood hazard zone (Sand Creek) (FEMA 2009), the project does not include the construction of housing. Therefore, the project will have **no impact**.

h) *Would the project place within a 100-year flood hazard area structures that would impede or redirect flood flows?*

The existing basins are located adjacent to Sand Creek which is designated as a 100-year flood hazard zone (FEMA 2009). The basin expansions will include portions of Sand Creek and redirect flows for the purposes of providing flood protection for nearby and downstream communities.

The USCB expansion will include a basin inlet on the southwest side to receive upstream flows from Sand Creek, a primary spillway outfall on the southeast side (under the dam) to drain low-flow or ponded water in the basin, and an emergency spillway on the east side of the dam to direct flows greater than the 100-year storm event downstream to Sand Creek. The two existing 84-inch diameter basin inlet pipes at the northwest side of the existing basin that currently drain local stormwater runoff will remain; a drainage ditch will be created to re-direct local stormwater runoff flows to Sand Creek. The basin will be a normally dry reservoir (except for low-flows) that will attenuate peak runoff by containing stormwater flows up to the 100-year storm event. During typical rains, the creek and local stormwater runoff flows will be carried through a low-flow channel and will discharge through the primary outlet pipe under the dam. Creek flows that exceed the inlet-controlled discharge capacity of the outlet works from more severe storms will then pond in the basin and the basin stage will rise. After the peak of the storm has passed, and once the creek flow becomes smaller than the outlet discharge, the water stored in the basin will be passively released back to Sand Creek. For storms greater than the 100-year storm event, flood flows will pass over the emergency spillway and follow a controlled route to enter the creek downstream of the basin.

Expansion of LSCB includes the construction of wing walls and inlet weir in Sand Creek at the northwest corner of the basin to direct upstream Sand Creek flows into the basin. During low flows, runoff that enters the basin will continue downstream, unattenuated, through a 60-inch diameter primary spillway/outfall pipe that will extend along the north side of the basin under a bench in the basin embankment. The basin will be a normally dry reservoir (except for low-flows) that will attenuate peak runoff by containing stormwater flows up to the 100-year storm event. The 60-inch diameter pipe will continue approximately 1,300 feet downstream of the basin under the basin embankment where it will discharge into the drop structure in Sand Creek at the northwest corner of Fairview Avenue and Sand Creek Road. During significant storm events, higher flows will create increasing head at the inlet to the 60-inch diameter primary spillway pipe. The head will continue to rise until stormwater spills over the weir crest and into the basin. After the peak of the storm passes, the basin will drain back via flap-gated openings that are proposed within the wall of the inlet weir. A perpetual pond will not occur in the basin as the low flow section will be graded to drain and an 18-inch diameter secondary drain pipe will be installed at the downstream side of the basin.

### **IMPACT HYD-1:**

After project completion, the flood hazard would be eliminated. However, unless the official FEMA maps are updated, the owners of the properties within the designated flood prone areas would be required to purchase flood insurance, and property values could be impacted (Flood Control District 1992).

### **MITIGATION MEASURE HYD-1:**

The Flood Control District will petition FEMA to re-evaluate the Flood Insurance Rate Maps upon completion of the flood control improvements. Project impacts will be **less than significant** with implementation of this measure.

- i) *Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of a failure of a levee or dam?*

While the purpose of the project is to provide increased flood control protection, failure of either basins could flood surrounding communities. The basin expansions have incorporated design features to prevent flooding and dam failure. The regional goal for USCB and LSCB is to attenuate peak flows from Sand Creek into Marsh Creek to 400 cubic feet per second (cfs) for a 100-year storm event. Analyses of the Sand Creek drainage area indicate that 900-acre feet and 300-acre feet of flood storage capacity are ultimately required at the USCB and LSCB sites, respectively.

For the USCB, it has been determined that a reservoir capacity of approximately 900-acre feet is needed to route the flow from the 100-year storm event through the outlet works and limit the peak reservoir stage below the emergency spillway crest at 191 feet elevation. The peak outflow from the outlet works would be approximately 134 cubic feet per second (cfs). The peak outflow from the emergency spillway resulting from the 1,000-year storm event is approximately 2,500 cfs with maximum reservoir level at 193.5 feet elevation which is 1.5 feet below the crest of the dam. These calculations were based on an empty reservoir at the beginning of the storm (GEI 2009).

For the LSCB, it has been determined that a reservoir capacity of approximately 300 acre-feet is needed to route the flow from the 100-year storm event through the outlet works and limit the peak reservoir stage below weir crest at 110 feet elevation. The peak outflow would be approximately 210 cfs through the 60-inch diameter primary spillway pipe while approximately 1,050 cfs will spill into the basin (Fugro West 2003).

### **IMPACT HYD-2:**

While the basins will be designed and constructed to withstand major storm events in accordance to applicable state and local guidelines, unforeseen basin failure could impact surrounding communities.

### **MITIGATION MEASURE HYD-2:**

Both basins will be under the jurisdiction of the DSOD and therefore a dam failure inundation map will be submitted to the Office of Emergency Services who in turn will adopt emergency procedures for the evacuation and control of areas in the event of a dam failure (DSOD 2010, ABAG 2010). Project impacts will be **less than significant** with implementation of this measure.

j) *Would the project be subject to inundation by seiche, tsunami or mudflow?*

The basins are not in an area subject to seiche, tsunami, or mudflow. Therefore, the project will have **no impact**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>X. LAND USE AND PLANNING</b>				
Would the project:				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## IMPACT DISCUSSION

### a) *Would the project physically divide an established community?*

Expansion of the existing flood control basins will not physically divide an established community as the purpose of the project is to provide adequate flood control protection for the surrounding communities. Therefore, the project will have **no impact**.

### b) *Would the project conflict with any applicable land use plan policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?*

The County General Plan designates both the USCB and LSCB as public/semi-public which identify lands owned by public governmental agencies to provide public use such as libraries, fire stations, schools as well as public transportation corridors and privately-owned transportation and utility corridors (i.e., PG&E, railroads, pipelines). The USCB is located within the City of Antioch's Sand Creek Focus Area and has been designated as Public/Quasi Public for public and institutional activities. The LSCB is located within City of Brentwood's Special Planning Area D and has been designated Public Facility.

The basin expansions will not conflict with the County or cities' land use designations as both cities have identified adjacent parcels as planned park developments. While portions of adjacent parcels at USCB will be purchased to accommodate the expansion, the land acquisitions will not lead to modification of the existing land use designations of these parcels. Therefore, project will not conflict with any local plans.

- c) *Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?*

As discussed in section IV, both basins are located within the East Contra Costa County Habitat Conservation Plan (HCP) inventory area. USCB and LSCB have been identified in the HCP as covered activities. The project will comply with the requirements of the HCP as described in section IV. Therefore, project will not conflict with the HCP.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

## XI. MINERAL RESOURCES

Would the project:

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Mineral resources are important in Contra Costa County as in other counties because minerals such as crushed rock, sand, among others supply the necessary components for construction materials such as asphalt and concrete for current and future development which provides significant employment within the County. The most important mineral resources that are currently mined in the County include diabase near Mt. Zion on the north side of Mt. Diablo, which provides crushed rock primarily for roadbase and streambank stabilizations; domestone sandstone, located just south of Camino Diablo and east of Vasco Road in the Byron area, which is the sole deposit in the State of California and an important resource nationally, primarily used by Pacific Gas & Electric Company as trench backfill and is a primary ingredient in the manufacture of heat-resistant glass used in the national space program; and shale in the Port Costa area, which has been designated for protection by the County General Plan (Contra Costa County 2005g).

## IMPACT DISCUSSION

- a) *Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*

There are no mapped mineral resource areas in the vicinity of either basin (Contra Costa County 2005g, Figure 8-4). The project will not impact the availability of mineral resources that would be of value to the state or region. Therefore, the project will have **no impact**.

- b) *Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?*

There are no mapped mineral resource areas in the vicinity of either basin (Contra Costa County 2005g, Figure 8-4). The project will not adversely affect the availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Therefore, the project will have **no impact**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XII. NOISE</b>				
Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Exposure of persons to or generation of excessive groundbourne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The traditional definition of noise is “unwanted or disturbing sound”. Sound becomes unwanted when it either interferes with normal activities such as sleeping, conversation, or disrupts or diminishes one’s quality of life. Persistent and escalating sources of sound can often be considered an annoyance which can have major consequences, primarily to one’s overall health. Problems related to constant or high levels of noise include stress related illnesses, high blood pressure, speech interference, hearing loss, sleep disruption, and lost productivity (USEPA 2010).

The main contributors to a community noise problem are transportation sources such as highways, railroads, and airport as they are the most pervasive and continual. Other temporary noise sources can add to the noise problem such as a jackhammer at a construction site. The dynamic of the noise problem are based on the relationship between the noise source, the person or place

exposed to the noise (receiver or sensitive receptor) and the path the noise will travel from the noise source to the receiver/sensitive receptor. Since the ear is not as sensitive at some frequencies and sound pressure level as at others, several methods of expressing average noise levels over a period of time have been developed (HUD 2010) .

Sound intensity is typically measured in decibels (dB) from a range of 0 (threshold of hearing) to 140 (threshold of pain); the higher the decibels, the greater the intensity. For example, a decibel level of 10 is the sound of leaves rustling, a decibel level of 30 is a whisper, a decibel level of 60 is freeway traffic, a decibel of 90 is a noisy urban street, and a decibel level of 140 is a nearby jet engine (HUD 2010). Prolonged exposure from at least 75 dB increases tension affecting blood pressure, heart function, and nervous system; prolonged exposure from at least 85 dB causes physical damage to human hearing; above 90 dB results in permanent cell damage, at 140 dB feeling of pain, and 190 dB will rupture the eardrum and permanently damage the inner ear (City of Antioch 1992).

The Noise Control Act of 1972 directed EPA to promote an environment for all Americans free from noise that jeopardizes their health and welfare. The Quiet Communities Act of 1978 amended the Noise Control Act to encourage noise control programs at the State and community level (HUD 2010). Section 65302(f) of the California Government Code requires that a noise element be prepared as a part of all city and county general plans. The Noise Element of a General Plan provides a basis for comprehensive local programs to control and abate environmental noise and to protect citizens from excessive exposure. The California Department of Health Services prepared Noise Element Guidelines which defines noise metrics, discusses the process of noise element development, and present land use compatibility guidelines based on various noise levels (California Environmental Resources Evaluation System 2010).

Since both basins are owned and operated by the Flood Control District, the Contra Costa County General Plan was reviewed as well as the cities of Antioch and Brentwood General Plans. Each respective General Plan provides goals and policies to protect new and existing noise-sensitive areas by identifying maximum allowable exterior and interior noise exposure levels from transportation noise sources and non-transportation noise sources.

Land uses in the vicinity of USCB consist of open grazing land followed by residential communities to the north, east, and south, including a magnet school (Antioch Unified School District Medical High School) and Kaiser Hospital approximately ¼ mile to the north. A formerly-occupied residential dwelling immediately adjoins the USCB to the southwest, which is now owned by the Antioch Unified School District and used as a teacher-training facility. The LSCB site is immediately adjoined by a residential development to the west, a vacant field and a residential development to the north, a vacant field and Fairview Avenue and residential development to the east, and Sand Creek Road and residential development to the south. An elementary school is located approximately ¼ mile south of Sand Creek Road.

## **IMPACT DISCUSSION**

- a) *Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies?*

The expanded basins will not generate noise. However construction of both basins will temporarily generate noise from construction equipment. In general, construction equipment generates noise levels ranging from about 76 to 88 decibels at 50 feet from the noise source,

with slightly higher levels of about 88 to 91 decibels for certain types of earthmoving and impact equipment (USEPA 1971). Construction activities for this project will have comparable noise levels. The County General Plan provides a general guideline of conducting construction activities during the hours of the day that are not noise-sensitive for adjacent land uses and should occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods whereas the cities of Antioch and Brentwood provide more specific guidelines as follows:

USCB is located within the City of Antioch. The City of Antioch General Plan regulates construction activity operations from 7:00 a.m. to 7:00 p.m. Monday through Saturday and no construction on Sundays or holidays, Antioch's zoning ordinance provides different time periods of 7:00 a.m. to 6:00 p.m. weekdays and on weekends and holidays between 9:00 a.m. to 5:00 p.m. However, if construction activities occur within 300 feet of occupied dwelling space, hours should be 8:00 a.m. to 5:00 p.m. weekdays (City of Antioch Zoning Ordinance 2010b).

LSCB is located within the City of Brentwood and is adjoined by residential developments which may be impacted by noise associated with construction of the basin expansion. Brentwood's General Plan states that construction activities near sensitive land uses should be limited to the hours of 9 a.m. to 7 p.m. on weekdays and 8 a.m. to 7 p.m. on Saturday with no construction allowed on Sundays; Brentwood's zoning ordinance provides different time periods of 8 a.m. to 5 p.m. during the weekdays and 9 a.m. to 4:00 p.m. on Saturdays, and no construction on Sundays or city holidays (City of Brentwood Zoning Ordinance 2010b)). The zoning ordinance hours of operation should be referred to over the General Plan (pers. comm. Zilm). However, grading activities that occur within residential zones, or within 1,000 feet of any residential occupancy, hotel, motel, or other hospital, the hours shall be limited to 8:00 a.m. to 5:30 p.m. (City of Brentwood Zoning Ordinance 2010c).

Project contract specifications will require the contractor to comply with each city's respective hours of operation to minimize impacts to nearby sensitive receptors (residences, schools, hospitals, etc.). In general, project contract specifications require the contractor ensure that stationary and mobile construction equipment are properly tuned and maintained to minimize noise impacts as well as eliminating unnecessary equipment idling and placement of equipment such that emitted noise is directed away from sensitive noise receptors, if feasible. Therefore, project impacts will be **less than significant**.

*b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?*

The project will not result in generation of excessive groundbourne vibration or noise levels than what exists currently. While construction activities include operation of large pieces of equipment (e.g., graders, excavators) that may result in the periodic temporary generation of groundborne vibration, the County and City General Plans provide a general guideline of conducting construction activities during the hours of the day that are not noise-sensitive for adjacent land uses and should occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods. Therefore, project impacts will be **less than significant**.

- c) *Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?*

Neither basin will result in a permanent increase in ambient noise levels above current conditions. Therefore, the project will have **no impact**.

- d) *Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*

See discussion under Item (a) above. Therefore, project impacts will be **less than significant**.

- e) *For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

Neither basin is located within two miles of an airport. Therefore, the project will have **no impact**.

- f) *For a project located within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?*

Neither basin is located in the vicinity of a private airstrip. Therefore, the project will have **no impact**.

ISSUES:	Potentially Significant Impact	Less Than Significant	Less Than Significant Impact	No Impact
		With Mitigation Incorporated		

### XIII. POPULATION AND HOUSING

Would the project:

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| a) induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

The 2000 census indicates that Contra Costa County is home to approximately 949,000 residents, making it the ninth most populous county in California. In general, the County can be divided into three primary subregions – West, Central, and East. West County is urbanized with a developed industrial base; Central County is a rapidly urbanizing area with much new office and light industrial development; and East County has historically been primarily agricultural but has been experiencing considerable residential development. Single-family homes are the predominant housing type in the County, especially in the unincorporated areas. An important goal for the County is to maintain and enhance the quality of the housing stock and residential neighborhoods (Contra Costa County 2005i).

### IMPACT DISCUSSION:

- a) *Would the project induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?*

The proposed project is located within an existing flood control facilities and lands owned by the Flood Control District. The existing basins currently receive local runoff from adjacent subdivisions. The project will not induce substantial population growth as the purpose of this expansion project is to provide increased flood control protection for recent and planned communities in the cities of Antioch, Brentwood, and Oakley. Therefore, the project would have **no impact**.

- b) *Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?*

The project will not displace substantial numbers of existing housing, necessitating the construction of replacement elsewhere as the project is to expand an existing flood control

basin to provide increased flood control protection for the communities in the cities of Antioch, Brentwood, and Oakley. Therefore, the project would have **no impact**.

- c) *Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?*

The project will not displace substantial numbers of people, necessitating the construction of replacement housing elsewhere as the project is to expand an existing flood control basin to provide increased flood control protection for the communities in the cities of Antioch, Brentwood, and Oakley. Therefore, the project would have **no impact**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XIV. PUBLIC SERVICES</b>				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## IMPACT DISCUSSION

- a) *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:*

### *Fire protection?*

The Contra Costa County Fire Protection District provides fire protection and emergency services to Antioch; the East Diablo Fire Protection District and Oakley Fire Prevention District provide services to Brentwood (Contra Costa County 2005j). The project would not result in the need for increased fire protection services. The majority of the work would occur within the basins during construction. Access to and from the facility would be maintained to ensure proper site access if fire protection vehicles needed to access the site. Further, traffic control will be implemented for construction trucks accessing and leaving the site to ensure no interference to moving emergency vehicles. Therefore, project impacts will be **less than significant**.

### *Police protection?*

The City of Antioch and City of Brentwood Police Department services areas within their respective city limits and the Contra Costa County Sheriff's Department services the unincorporated areas of the cities' planning areas (Contra Costa County 2005j). The project would not result in the need for increased police protection services. The majority of the work would occur within the basins during construction. Access to and from the facility would be maintained to ensure proper site access if law enforcement vehicles needed to access the site. Further, traffic control will be implemented for construction trucks accessing and leaving the

site to ensure no interference to moving emergency vehicles. Therefore, project impacts will be **less than significant**.

*Schools?*

The Antioch Unified School District serves the majority of Antioch; a small area in the southeastern portion of Antioch is served by the Brentwood Unified School District (grades K-8) and the Liberty Union High School District (grades 9-12) (City of Antioch 2003). Schools serving the Brentwood area include: Brentwood Union School District, Liberty Union School District, Knightsen School District, Byron Union School District, Oakley Union School District, and Contra Community College District (City of Brentwood 2009). Expansion of the basins would not result in the need for construction of a new school facility or expansion of an existing facility. Therefore, the project will have **no impact**.

*Parks?*

The project would not result in the need for construction of parks. The expanded basins would not conflict with the proposed sports complex parks being considered at each site by the City of Antioch and City of Brentwood. All improvements associated with the sports complex parks at the basins will be evaluated in a separate CEQA document by each of the respective cities. Therefore, the project will have **no impact**.

*Other public facilities?*

No other public facilities would be impacted. Therefore, the project will have **no impact**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XV.RECREATION</b>				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## IMPACT DISCUSSION

- a) *Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*

Expansion of the existing flood control basins would not result in the use of existing recreational facilities. Therefore, the project will have **no impact**.

- b) *Does the project include recreational facilities, or require the construction or expansion of existing facilities, which might have an adverse physical effect on the environment?*

While the project would not generate the need to create new or expand existing recreational facilities, the cities of Antioch and Brentwood have considered multi-use of the expanded flood control basins for sports and recreational facilities which is consistent with their General Plans. The respective city would evaluate their proposal in a separate CEQA document. Therefore, project impacts will be **less than significant**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XVI. TRANSPORTATION/TRAFFIC</b>				
Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including by not limited to intersection, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Traffic circulation is of local and regional nature as it includes the movement of people and goods using all modes of transportation and it affects land use, community design, growth management, economic development, air quality, energy consumption, infrastructure, and emergency services (City of Antioch 2003d).

The Circulation Element of General Plans describes the services, facilities, and capital improvements that are needed to facilitate vehicle, pedestrian, transit, bicycle, and emergency transportation. It also describes methods for promoting and encouraging the use of alternative transportation modes, accommodating growth in travel demand, and preserving safety. It is important to plan for future circulation facilities and services in conjunction with planned population growth and future land use patterns (City of Brentwood 2009e).

Both the Cities of Antioch and Brentwood have identified major arterial roads for transportation access and mobility which provide through-traffic within the urbanized sections and access to freeways and expressways. Both basins are accessed by major arterial roads; USCB is accessed from Deer Valley Road and LSCB is accessed from Sand Creek Road.

## IMPACT DISCUSSION

- a) *Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including by not limited to intersection, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit?*

The expansion and operation of the flood control basins will not create new or increase existing transportation. However, construction of the project would cause a temporary increase in existing traffic of nearby roads from construction vehicles and haul trucks. Approximately 110,000 cubic yards of soil will be hauled away from USCB which would result in approximately 5,500 truck load trips (using a 20-cubic yard truck) over a six-month period resulting in approximately 35 trips per work day. The average daily traffic on Deer Valley Road from 500 feet north of Empire Road to Lone Tree Way is 12,059 (2007 data) (pers. comm. City of Antioch).

At LSCB, approximately 202,000 cubic yards will need to be hauled away which would result in approximately 10,100 truck load trips (using a 20-cubic yard truck) over a six-month period resulting in approximately 65 trips a day. The average daily traffic on Sand Creek Road between Fairview Avenue and Highway 4 Bypass is 7,651 for westbound traffic and 10,034 for eastbound traffic (2007 data) (pers. comm. City of Brentwood).

Efforts will be made to provide soil to nearby projects in need of soil (i.e., Highway 4/Loveridge Road Expansion, Sand Creek interchange, EBART).

The Cities of Antioch and Brentwood require truck permits for use of city streets (Brentwood Ord. 592, Section 1 (Exhibit 1 (part)), 1998; Antioch, Article 14, Section 4-5.1405). In addition, the City of Brentwood enforces special hours of 9:00 a.m. to 3:00 p.m. Monday through Friday on work affecting traffic on various roads including Sand Creek Road and Fairview Avenue to minimize impacts to commuter and school traffic. The City of Brentwood also requires a traffic control plan.

These traffic measures are expected to minimize significant congestion and delays. Therefore, project impacts will be **less than significant**.

- b) *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?*

As described above, the expanded flood control basins would not cause a substantial increase of existing traffic that would exceed the level of service standard for the nearby roadways. Construction of the project will result in a temporary increase in off-haul truck traffic however measures outlined above will be incorporated into the project specifications which will minimize impacts to existing traffic. Therefore, project impacts will be **less than significant**.

- c) *Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?*

Neither basin would result in a change in air traffic patterns as there will be no increase in traffic levels or change in location that would pose a substantial safety risk. Further, neither basin is located within a vicinity of an airport. Therefore, the project will have **no impact**.

- d) *Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

The project would not increase design feature hazards as these basins are located off the roadway system and would not result in changes to existing roads in the area. Therefore, the project will have **no impact**.

- e) *Would the project result in inadequate emergency access?*

The majority of the work will occur within the flood control basins during construction. Traffic control measures for off-haul truck traffic on Deer Valley Road for USCB and Sand Creek Road for LSCB will ensure that there is no interference with passing emergency vehicles. In addition, a traffic control plan will be submitted to the respective cities for approval. Therefore, project impacts will be **less than significant**.

- f) *Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?*

Expansion of the basins will not conflict with adopted policies, plans or programs supporting alternative transportation. The USCB site is located in Antioch's Sand Creek Focus Area which has identified a goal of developing a sports complex (City of Antioch General Plan 2002, page 4-56). Upon completion, USCB will be suitable for this use which will also provide an opportunity for a recreational trail system. The LSCB site is located in Brentwood's Special Planning Area D, which has planned for a community park adjacent to the LSCB site. The abandoned old Sand Creek Road that adjoins the LSCB site is planned as a future Class I bikeway/trail (City of Brentwood 2009, Page III.3-15, Figure 11). The expansion will move the trail to the north side of the basin upon project completion and will be compatible with the city of Brentwood's future park and trail plans. Therefore, project impacts will be **less than significant**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>XVII. UTILITIES AND SERVICE SYSTEMS</b>				
Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

#### ***Wastewater Treatment***

Delta Diablo Sanitation District (DDSD) is responsible for conveyance of wastewater from city of Antioch pipelines to interceptor sewers, which convey sewage to the Bridgehead and Antioch pump stations located in southeast Antioch and at Fulton Shipyard Road, respectively. The wastewater is treated at the DDSD plant located near the border of Antioch and Pittsburgh (City of Antioch 1993e). The City of Brentwood Wastewater Treatment Plant receives and treats wastewater and discharges into Marsh Creek.

City of Brentwood 2009d)

#### *Storm Drainage*

Storm drainage in both the Antioch and Brentwood areas are largely provided by surface drainage facilities, including roadside ditches, surface collection, and shallow drain pipes. The Contra Costa County Flood Control and Water Conservation District oversees stormwater collection and flood control of which discharge into channels and detention basins owned and maintained by both cities and the Flood Control District (City of Antioch 1993f, City of Brentwood 2009f).

#### *Water Supply*

The City of Antioch supplies the entire city as well as unincorporated areas within the city's sphere of influence. The city purchases the water from Contra Costa Water District, which obtains the water from the San Joaquin River, and distributes it to their water treatment and storage plants (City of Antioch 1993g). The City of Brentwood provides water supply to its residents. The primary water is groundwater, supplemented by treated surface water (City of Brentwood 2009f).

#### *Solid Waste*

Pleasant Hill Bayshore Disposal provides solid waste collection, disposal, recycling and yard waste services for Antioch which are taken to the Contra Costa Transfer and Recovery Station located in Martinez where recyclables are separated out and stored before shipment to recycling markets. In Antioch, solid waste is collected by Brentwood Disposal Service and disposed of in the Contra Costa County landfill at Keller Canyon (City of Antioch 1993h). Solid waste in Brentwood is collected by Brentwood Disposal Service and disposed of in the Contra Costa landfill at Keller Canyon (City of Brentwood 2009f).

### **IMPACT DISCUSSION**

- a) *Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?*

Neither basin would result in the need for wastewater treatment. Waste from portable toilets used during construction would not exceed the requirements. Therefore, the project will have **no impact**.

- b) *Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*

Neither basin would require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities. Therefore, the project will have **no impact**.

- c) *Would the project require or result in the construction of new construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*

Expansion of both basins will not cause significant environmental effects. However, during construction, sensitive natural communities that provide suitable habitat for special-status species will be disturbed (Sand Creek, wetlands, riparian oak woodland/scrub). As discussed in the Biological Resources section, permanent and temporary impacts will be mitigated on-site and development and wetland impact fees will be paid to the East Contra Costa County Habitat Conservancy. Therefore, project impacts will be mitigated to **less than significant** with incorporation of these mitigation measures.

- d) *Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?*

Neither basin would require water supply service. Therefore, the project will have **no impact**.

- e) *Would the project result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments?*

Neither basin requires wastewater treatment services. Therefore, the project will have **no impact**.

- f) *Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?*

The expanded basins would not generate solid waste disposal needs. However, construction of the project would generate some waste from removal of the historic homestead buildings at USCB which is an insignificant amount and therefore, would not exceed the permitted capacity. Further, appropriate building materials would be offered to salvage companies for re-use. Excavated soil would be used on-site and for fill at other sites. Therefore, project impacts will be **less than significant**.

- g) *Comply with federal, state and local statutes and regulations related to solid waste?*

Project specifications will require that the contractor dispose of solid waste generated from construction in accordance with federal, state and local regulations. Therefore, the project will have **no impact**.

ISSUES:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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### XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

- a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of fish and wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? ☐ ☒ ☐ ☐
- b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? ☐ ☐ ☐ ☒
- c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? ☐ ☒ ☐ ☐

- a) *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of rare or endangered plants or animals, or eliminate important examples of the major periods of California history or prehistory?*

Construction of the basins initially will temporarily degrade the quality of the local habitat at each site during construction, but subsequent to restoration of impacted areas will eventually increase the value of the natural communities and associated wildlife species (see Section IV). While the project will remove an old historic ranch homestead of local significance, the on-site buildings are in a state of disrepair and determined not to be of historic significance to California. However, collected artifacts will be offered to interested local historical societies to expand their existing collection of the local history. Implementation of the mitigation measures will reduce project impacts to **less than significant**.

- b) *Does the project have impacts that are individually limited, but cumulatively considerable? "Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects?*

The project will not have cumulative impacts as there are no other flood control projects planned for the Sand Creek Drainage Area. Therefore, the project will have **no impact**.

- c) *Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?*

The project is intended to provide flood control protection to surrounding and downstream communities. After completion, the flood hazard would be eliminated. However, unless the official FEMA maps are updated, the owners of the properties within the designated flood-prone areas would be required to purchase flood insurance, and property values could be impacted. Therefore, the Flood Control District will petition FEMA to re-evaluate the Flood Insurance Rate Maps. In addition, while the basins will be designed and constructed to withstand major storm events in accordance to applicable state and local guidelines, unforeseen basin failure could impact surrounding communities. Since both basins are under the jurisdiction of the DSOD, a dam inundation map will be submitted to the Office of Emergency Services who in turn will adopt emergency procedures for the evacuation and control of areas in the event of a dam failure. Implementation of these measures will reduce project impacts to **less than significant**.

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4001-1503

# DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE MARSH CREEK WATERSHED REGIONAL DRAINAGE PLAN



INCLUDING:

ENGINEER'S REPORT — APPENDIX B

3168-03

ENVIRONMENTAL IMPACT REPORT  
MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES  
CONTRA COSTA COUNTY  
CP # 88-69

MARCH 1990

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## SUMMARY

The Contra Costa County Flood Control and Water Conservation District proposes the establishment of five (5) new drainage areas within the Marsh Creek watershed, and the construction of regional flood control improvements designed to prevent flooding along the Marsh Creek channel during 100-year storms. The Marsh Creek watershed is an area of approximately 80 square miles, located between Mt. Diablo State Park and the City of Brentwood. The watershed's main channel is Marsh Creek, which flows easterly into the existing Marsh Creek Reservoir, then northeasterly through the City of Brentwood to the San Joaquin River at Big Break. Three (3) intermittent streams: Sand Creek, Deer Creek, and Dry Creek flow easterly through subwatersheds of Marsh Creek and into the main channel.

The proposed improvements include construction of three new flood control basins, along the lower reaches of Sand Creek, Deer Creek and Dry Creek; improvement of the existing Deer Creek Reservoir to increase its capacity; and excavation of a 7000-foot reach of Marsh Creek (between Sand Creek and Dry Creek), to increase its capacity.

The primary problem within the watershed is periodic flooding from Marsh Creek, along with damage to residential and commercial development. Between 1952 and 1965, damaging floods occurred, on an average, once each three years, although it has not been unusual for flooding to occur more than once during a year. From 1965 to the present, damaging floods have occurred only twice. During January 2-4 1982, a heavy rainstorm, with a level of precipitation which estimated to have a recurrence interval of approximately 25-100 years for the 24-hour period, filled the Marsh Creek Reservoir. Due to the size of the storm, discharge occurred over the emergency spillway, and flooding resulted along Marsh Creek.

In recent years, new development in the lower area of the watershed has increased flood flows; and continuing development, in conformance with the land use designations of the Antioch, Brentwood, and County general plans, will continue to increase peak runoff and flooding potential. These factors, along with the inability of the Marsh Creek channel to accommodate runoff from the January, 1982 storm, stimulated the Flood Control District's decision to pursue establishment of five new drainage areas and to obtain approval of various drainage improvements designed to prevent flooding along Marsh Creek during a 100-year storm.

Construction of the proposed flood control facilities will be financed by fees charged to new development within each of the five drainage areas, and existing Drainage Areas 30B, 52A and 52B. In some cases, developers working in the areas

of the facilities will be allowed to "work off" fee obligations by contributing manpower and equipment to construction of portions of the improvements.

Figures 1 through 8 show the proposed drainage areas, improvement site locations, and preliminary plans for improvements. The following is a summary of significant impacts and potential mitigation measures.

#### A. LAND USE

##### 1. Possible Future Changes in Watershed Land Use Plans

Impact. The Flood Control District's land use assumptions are based on no significant development upstream from the existing Marsh Creek and Deer Creek Reservoirs, and buildout of the Brentwood and Antioch areas under the current general plans. In the future, however, land use planning decisions may change in these watersheds, and the proposed facilities may not be adequate to accommodate additional, periodically heavy peak runoff from development not currently anticipated in upstream areas.

Mitigation. The Flood Control District used the current 1981 City of Antioch Land Use Plan, the 1983 City of Brentwood Land Use Plan, and the 1978 East County Area General Plan. If urbanization precedes past these established levels of development, additional flood control improvements may be needed.

The proposed Dry Creek and Deer Creek Basins have little potential for future modification to increase capacity. The Sand Creek Basin could possibly be expanded. If land uses change, additional basins may be required higher in the watershed. The County should consider the feasibility of large basins in any upstream land development projects that are on lands currently considered to be open space.

#### B. HYDROLOGY AND FLOOD HAZARDS

##### 1. Design Criteria for Proposed Facilities

Impact. The proposed detention basins are designed based on a 100-year, 6-hour storm. The 3-hour, 12-hour, 24-hour and 96-hour storms were studied. Based on a comparison of inflow to outflow for each basin, the 6-hour storm was found to represent a "worst case".

Mitigation. The flood control improvements shall be designed to contain the runoff from the 100-year, 6-hour storm.

## 2. Emergency Spillway

Impact. The schematics do not indicate how the emergency spillway will function, or how the downstream channel will be protected from erosion. There are potential liability problems if lands not presently subject to flooding are inundated as a result of surplus runoff from the basin.

Mitigation. Runoff carried by the emergency spillway shall be discharged into the downstream channel in a non-erosive manner, and lands which are currently free from flood hazards shall be protected from inundation.

## 3. Reevaluation of Flood Hazard Maps

Impact. FEMA flood hazard maps of the Marsh Creek watershed indicate that approximately 1500 acres are subject to inundation by the 100-year flood, with the existing land use pattern. With project completion, this hazard would be eliminated. However, unless official maps are changed, owners of properties within the designated flood prone areas would be required to purchase flood insurance, and property values could be adversely affected.

Mitigation. Upon completion of the flood control improvements, the Flood Control District should request that FEMA reevaluate the Flood Hazard maps.

## 4. Water Quality

Impact. The earthwork could result in increased turbidity, especially during the first two or three years after grading.

Mitigation. By keeping erosion to a minimum, increases in turbidity can be kept within acceptable limits. It is recommended that a revegetation and erosion control plan be incorporated into the project design, earthwork be limited to the dry season of the year, and that all fills be compacted and planted to control erosion.

## C. GEOLOGY, SEISMICITY AND SOILS

### 1. Erosion and Sedimentation

Impact. Soil erosion from graded and disturbed areas could increase by as much as 200 times over the prevailing rate during the period of construction when bare soils are exposed at the surface.

Mitigation. During construction, state and federal water pollution regulations will be complied with. The construction plans shall include specific steps to control erosion, and the body of the DEIR lists nine (9) potential measures,

including seeding, mulching, and the use of straw bale filters/silt fences.

## 2. Geologic Hazards

Impact. Although the sites are suitable for the intended use, geotechnical recommendations are needed to guide design, and supervision of the earthwork is needed to ensure satisfactory performance of improvements.

Mitigation. A geotechnical report is needed for each site to provide standards and criteria for the earthwork. Additionally, the excavations for the Deer Creek Reservoir should be mapped by an engineering geologist.

## 3. Seismicity

Impact. Groundshaking during an earthquake is a potential hazard to the drainage improvements.

Mitigation. A conservative design for embankment and other improvements can keep earthquake damage to a practical minimum. The geotechnical reports for each project site should provide an evaluation/professional opinion on the performance of improvements under earthquake conditions.

## 4. Prime Agricultural Land

Impact. An impact of the project will be the loss of 106.5 acres of prime farmland.

Mitigation. To a considerable extent, loss of prime soils is an unavoidable adverse impact. It should also be noted that the three proposed detention basins are in the urban growth area along the western fringe of Brentwood. Therefore, loss of these particular agricultural lands is inevitable, and was addressed when the Brentwood General Plan was adopted. If the Sand Creek basin is not developed by the City as a park, it will remain as open space.

## D. BIOTIC RESOURCES

### 1. Vegetation

Impact. In general, existing vegetation encompassed by proposed channel modifications and detention basins would be removed. This would include limited corridors of riparian vegetation along Marsh, Sand and Deer Creeks, areas of introduced annual grassland, agricultural fields and orchard, and ornamental landscaping in the vicinity of residences to be moved or demolished. Also, there is a possibility that important vegetation around the periphery of the sites could

be damaged or removed (an impact which cannot be fully assessed in the absence of final improvement plans).

Mitigation. Final improvement plans should provide specific measures for preservation of important vegetation, where the removal of such vegetation is not essential to the development of the facilities. The limitations of earthwork should be clearly established and maintained throughout the construction process, and grading should be avoided within the driplines of trees to be retained. This could best be achieved by installing temporary fencing around the periphery of areas that are to be retained in their natural state, and placing appropriate signs on the fence. A qualified plant ecologist or landscape architect shall be retained to prepare a mitigation plan addressing the loss of wetland habitat. This plan should include planting to replace lost vegetation and to enhance the wildlife habitat of the sites, with emphasis on native species, natural appearance, and enhancement of wildlife habitat.

## 2. Wildlife

Impact. Removal of the existing vegetation in the areas of the proposed improvements would also eliminate the existing wildlife habitat in those areas, and wildlife would be displaced during construction.

Mitigation. See mitigation for item #1, above. Reestablishment of riparian vegetation and intermittent landscaping with native species would serve to replace wildlife movement corridors and possibly enhance existing wildlife habitat.

## 3. Special Status Taxa

Impact. No special status taxa were encountered during the field surveys of the project vicinity, and no significant impacts on identified taxa are anticipated.

Mitigation. None required.

## 4. Wetlands

Impact. Modifications would be made to Marsh, Sand, and Deer Creek channels, all of which would be subject to review and approval by the California Department of Fish and Game (CDFG), and possibly the Corps of Engineers. Marsh Creek would be widened for a distance of approximately 7,000 feet. Stream channels and associated riparian vegetation along Sand Creek (approximately 3,200 feet) and Deer Creek (approximately 1,800 feet) would be replaced by detention basins. Although no riparian vegetation occurs along Dry Creek, approximately 750 feet of the channel would be replaced by a detention basin.

Mitigation. The revegetation plans for the proposed improvements should be coordinated with the CDFG and Corps of Engineers to ensure that the concerns and possible requirements of both agencies can be incorporated into final plans.

## **E. TRAFFIC AND CIRCULATION**

### **1. Traffic Safety**

Impact. Because access routes serving the proposed improvement sites generally have only two lanes with limited shoulder area, and rural road vehicle speeds tend to be high, there is a potential for traffic hazards at each of the sites, resulting from construction within a roadway (such as pipeline crossings) and maneuvering of construction vehicles onto and off of sites. In the case of the Dry Creek basin, which would require access along the residential streets of Subdivision 6492, construction traffic could result in traffic and pedestrian hazards along the minor roadways within developed residential projects.

Mitigation. Construction contractors should be required to provide flagmen, and other traffic control devices as needed, during roadway construction as well as along residential access routes to sites. Off-loading of construction materials, and queuing and parking of trucks and construction equipment, should occur within the boundaries of project sites, or outside of public road rights-of-way or travelways. Construction within heavily traveled roadways should include provision of temporary detour lanes to minimize through traffic congestion.

### **2. Vehicle Spillage and Dust**

Impact. Construction traffic could result in local dust and spillage problems around entrances to each site. Aggregate spills, dust buildup on roadways, or dirt tracked onto roadway surfaces could affect traction, particularly in wet weather, and would be a general nuisance.

Mitigation. Construction contractors should be required to keep roadways adjacent to project sites clear of dirt and spillage. Regular street sweeping may be required on a daily basis, or several times a day.

### **3. Damage to Roadway Pavement and Improvements**

Impact. Construction of the proposed improvements could result in damage to roadway improvements, including sagging or breaking of pavement in weak areas, or the breakdown of paved roadway edges by heavy vehicles.

Mitigation. Construction contracts should specify that contractors will repair any damage to roads caused by construction vehicles.

## F. PUBLIC HEALTH AND SAFETY

### 1. Mercury Contamination

Impact. The extent to which sediment-bearing heavy metals derived from the Mt. Diablo Quicksilver Mine (and the springs above the mine) may have contaminated the soil in Marsh Creek is not known. If the soils in the reach of Marsh Creek which is proposed for widening are contaminated with heavy metals, it is possible that their use as fill adjacent to the creek could result in hazards to human health, or to wildlife. Earthwork to construct the outfall for the proposed Dry Creek Basin, located immediately adjacent to Marsh Creek, could also involve contaminated sediments.

Mitigation. Although no evidence of mercury contamination exists downstream from the existing Marsh Creek Reservoir, it is recommended that fill materials excavated from the Marsh Creek channel be certified to ensure that the sediments are not contaminated. If the sediments are found to be contaminated, mitigation measures acceptable to the Regional Water Quality Control Board would be required.

### 2. Drowning Hazard

Impact. Although the proposed flood control facilities are expected to detain runoff only a few times each year, unrestricted access between residential developments and the basins could be hazardous during these periods. The most hazardous features of the basins would be the areas adjoining outflow structures, including the areas of debris catchers (trash racks) in front of these openings. Additionally, the channel of Marsh Creek may be hazardous.

Mitigation. Minimum mitigation should be the provision of fencing and signing, specifically around both inlet and outflow structures, and designing of trash racks to prevent access to the outfall structures by children. Additional access restrictions which should be considered are the following: a) retain the four-foot chainlink fences which are proposed around the new basins, even if the basins are improved as park or nature areas, b) equip fence gates with latching devices which cannot be readily operated by small children, c) provide hazard warning signs at gates, and d) keep gradients within basins at a slope of 4:1 (horizontal to vertical) or flatter.

If a local park agency takes over responsibility for the proposed basins and/or the Marsh Creek Channel for passive

or active uses, (e.g. trails, recreation), fencing should be adapted to standards appropriate for the intended activities.

## G. NOISE

### 1. Construction Noise

Impact. Although the proposed projects would result in no significant long-term noise impacts, short-term construction activity would periodically generate high levels of noise which would be a nuisance to nearby residents.

Mitigation. A reasonable target for construction equipment noise is a maximum of 85 dBA at 50 feet (excluding pavement breakers). Means available to control noise are as follows: a) equipment with high quality mufflers, b) engine enclosure panels, c) prevention of unnecessary idling, d) good maintenance practices. e) restriction of construction activities to Monday through Friday, 8:00a to 5:00p, with no week-end or holiday work, and g) keeping nearby residents informed of planned work schedules and planned completion dates.

## H. AIR QUALITY

### 1. Construction Effects

Impact. Dust generation during various phases of construction activities could be a substantial nuisance to nearby residential properties and to motorists along roadways adjacent to the sites.

Mitigation. During clearing, grading, and other earthwork activities, water trucks or sprinkler systems should be used in sufficient quantities to prevent raised dust from leaving project sites. After earthworking activities are completed, long-term erosion control measures, including hydroseeding, should be promptly implemented.

## I. CULTURAL RESOURCES

### 1. Archaeology

Impact. There is potential for buried prehistoric cultural resources in the areas planned for the proposed improvements.

Mitigation. Although further archeologic field investigations are not deemed necessary by the archaeologist, construction workers involved in earthwork activities should be alerted to the potential for discovery of prehistoric materials. If such materials are encountered during construction,

all work within 100 feet of the find should be stopped, and a qualified archaeologist should be retained to evaluate the find and recommend specific mitigation measures.

## 2. Historic Resources

Impact. Project construction will not affect any known archaeological or historic resources. The project will reduce the potential for flood damage to the structures of local historic significance located in the core area of Brentwood.

Mitigation. None required.

## **I INTRODUCTION**

### **A. NATURE AND PURPOSE OF THE ENVIRONMENTAL IMPACT REPORT**

The California Environmental Quality Act of 1970 as amended (CEQA), requires EIRs to be prepared for all projects which may have a significant impact on the environment.

An EIR is an informational document, the purpose of which, according to the State Guidelines, is "...to identify the significant effects of a project on the environment, to identify alternatives to the project, and to indicate the manner in which such significant effects can be mitigated or avoided." The information contained in this report is intended to be objective and impartial, so as to permit the reader to arrive at an independent judgement as to the probable character and significance of the impacts resulting from the proposed residential development. The analysis of the proposed use of the project site provides an indication of the potential nature and scale of impacts of the project as described in the County's Initial Study, which is presented in Appendix A.

### **B. EIR METHODOLOGY AND REVIEW PROCESS**

This EIR addresses the request of the Flood Control District to establish five new drainage areas, along with approval of a plan for construction of regional drainage facilities in the Marsh Creek watershed and approval of a fee schedule.

The lead agency for this project is the Contra Costa County Flood Control and Water Conservation District (hereafter called the Flood Control District). The County Board of Supervisors has final authority for certifying the adequacy of the Environmental Impact Report and for discretionary approval action on the project. The hearing body of the Draft Environmental Impact Report is the Contra Costa East County Area Regional Planning Commission.

The Draft EIR will be subject to a 45-day public review period, during which interested individuals, organizations and agencies may offer their comments on the EIR's evaluation of project impacts and alternatives. The comments and questions received during this period will be compiled, and responses will be prepared by the consultants. The Response Document and the Draft EIR together will comprise the Final EIR.

After review of the Draft and Final EIR and following action to certify the EIR as complete and adequate, the Planning Commission and the Board of Supervisors will be in

a position to determine whether the project should be approved as submitted, be subject to revision, or be rejected. This determination will be based upon information presented on the project, its relationship to the County policies, goals and regulations, its impacts and probable consequences, and the possible alternatives or mitigation measures available. In accordance with recent legislation (AB 3180), the County will also be required to adopt a mitigation monitoring and reporting program to ensure that the mitigation measures identified for the project are implemented.

Because portions of the drainage areas are in the Cities of Antioch and Brentwood, they would also have responsibility for project approval.

#### C. INTENDED USES OF THE EIR

Agencies which may have permit-granting authority over the project are listed below together with a description of the various approvals granted under their jurisdiction:

1. Contra Costa County  
Approval of:
  - a) the EIR,
  - b) the ordinance allowing formation of five drainage areas, including the conceptual improvement plans for basins and channel widening,
  - c) fee schedules.
2. City of Brentwood  
Approval of:
  - a) ordinance allowing collection of drainage fees,
  - b) improvement plans for basins,
  - c) realignment of Sand Creek Road
3. City of Antioch  
Approval of:
  - a) ordinance allowing collection of fees
4. California Department of Fish and Game  
Approval of:
  - a) Stream Bed Alteration Agreement (1603 Permit) for alterations to Marsh Creek and construction of the three basins.

5. U.S. Army Corps of Engineers  
Possible requirement of:

- a) a permit under Section 404 of the Clean Water Act.

Other state and local permits may be required. The Flood Control District will be responsible for all permits and compliance with all laws and regulations.

## II PROJECT DESCRIPTION

### A. LOCATION

The Marsh Creek watershed is located approximately 40 miles east of San Francisco, in the eastern portion of Contra Costa County. Figure 1 shows the location of the watershed, along with the boundaries of the five proposed drainage areas. The watershed is a 51,400 acre area on the east flank of the Diablo Range and on the western edge of the San Joaquin Valley.

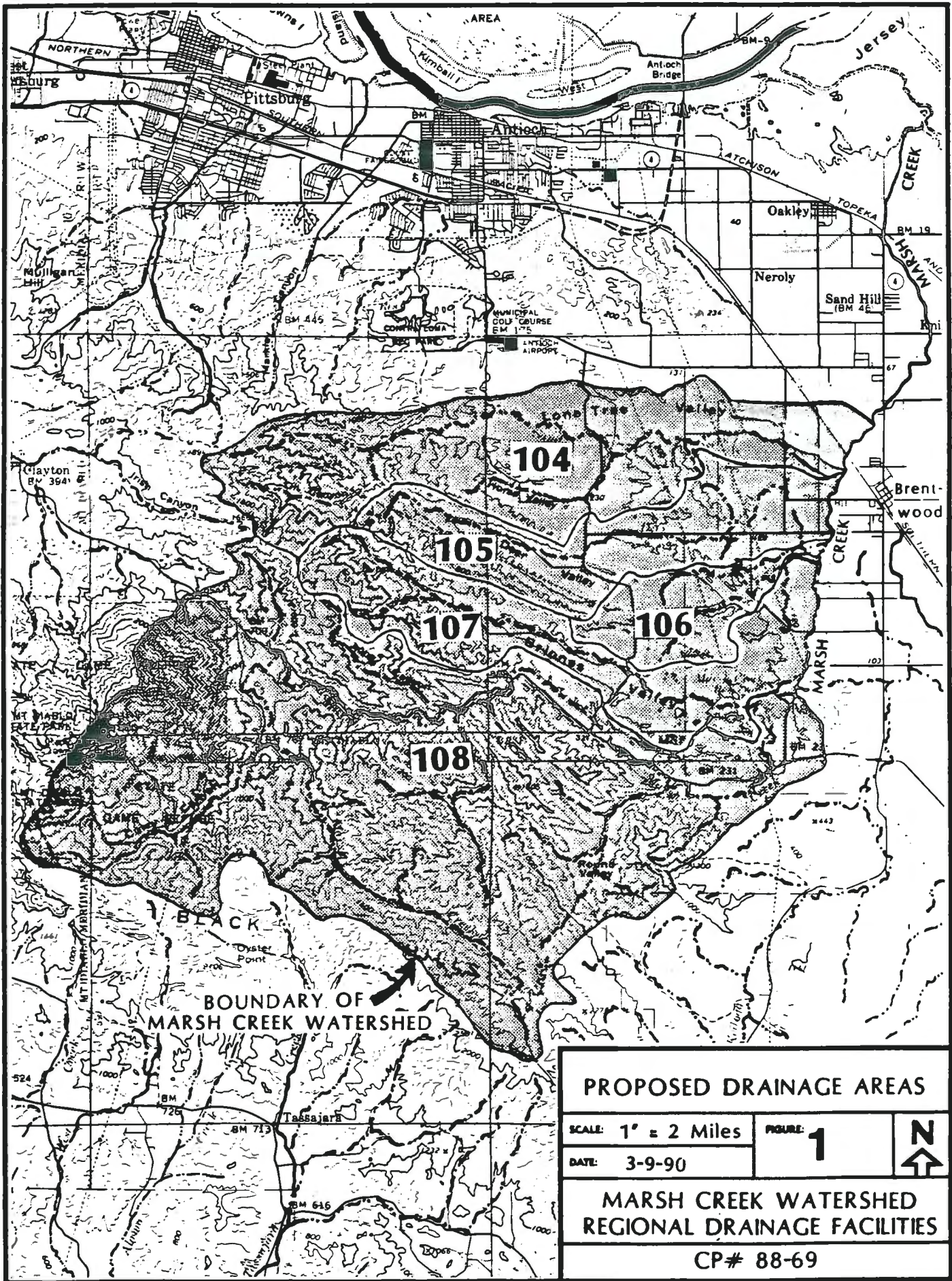
All streams in the watershed are classified as intermittent, except for the main channel of Marsh Creek. Tributary streams have a northwest trend, parallel to the structural grain of bedrock in the Diablo Range. As a result, the portion of the watershed in the Diablo Range possesses a trellis pattern. Tributary streams convey runoff to the channel of Marsh Creek, which flows northeasterly and outfalls into the San Joaquin River at Big Break.

The area has a Mediterranean climate with mild to moderately cold, wet winters and hot, dry summers. Mean annual precipitation ranges from nearly 25 inches in the higher elevations to 12.5 inches on the valley floor. At present the upper watershed is used by private property owners for grazing, and portions of the upper watershed are in State and Regional Parks.

The hills and ridges in the Marsh Creek watershed are underlain by bedrock of Tertiary through Cretaceous age (predominantly marine sandstones, shales and conglomerates). Stream channels and valley bottoms are mantled with recent alluvium in the middle and upper reaches of the watershed. This material has been eroded from the uplifted hillsides. The lower portion of the watershed is mapped as Quaternary alluvium, consisting chiefly of alluvial fan, stream channel and floodplain deposits.

Faults of regional significance that bisect the watershed include the active Greenville and Antioch faults, along with the Vaqueros fault system, which is not considered active by either the U.S. Geological Survey (USGS) or the California Division of Mines and Geology (CDMG).

The topography of the watershed can be split into two distinct areas: the upper watershed and the valley floor. The upper watershed is steep, with thin soils and rocky slopes covered with annual grasses, chaparral and pockets of native oaks. Much of this land is used for grazing. The headwaters of Marsh Creek start at an elevation of



nearly 3,850 feet MSL and drop rapidly over a 17 mile stretch to an elevation of 100 feet MSL where the creek meets the valley floor. The valley floor is characterized by nearly flat slopes with deep, alluvial soils. Most of the native vegetation has been removed and replaced by orchards, truck crops and small grains. In the valley, Marsh Creek has been altered from its natural course to follow property lines and agricultural boundaries; most of the riparian vegetation has been removed. Once it leaves the hills, the runoff carried by Marsh Creek flows about 16 miles across the gently sloping plain and empties into the San Joaquin River at Big Break. The elevation at the mouth of Marsh Creek is five feet MSL.

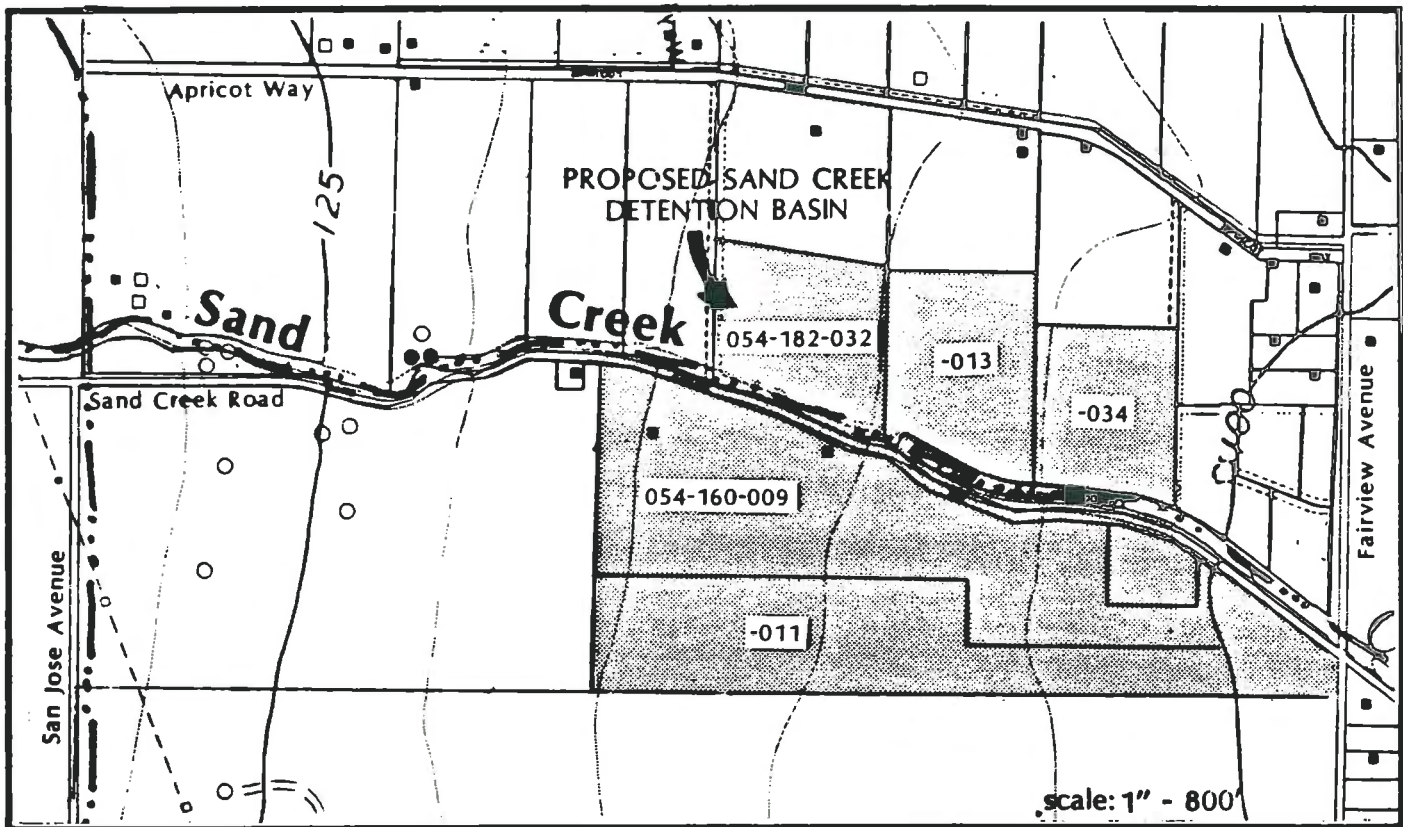
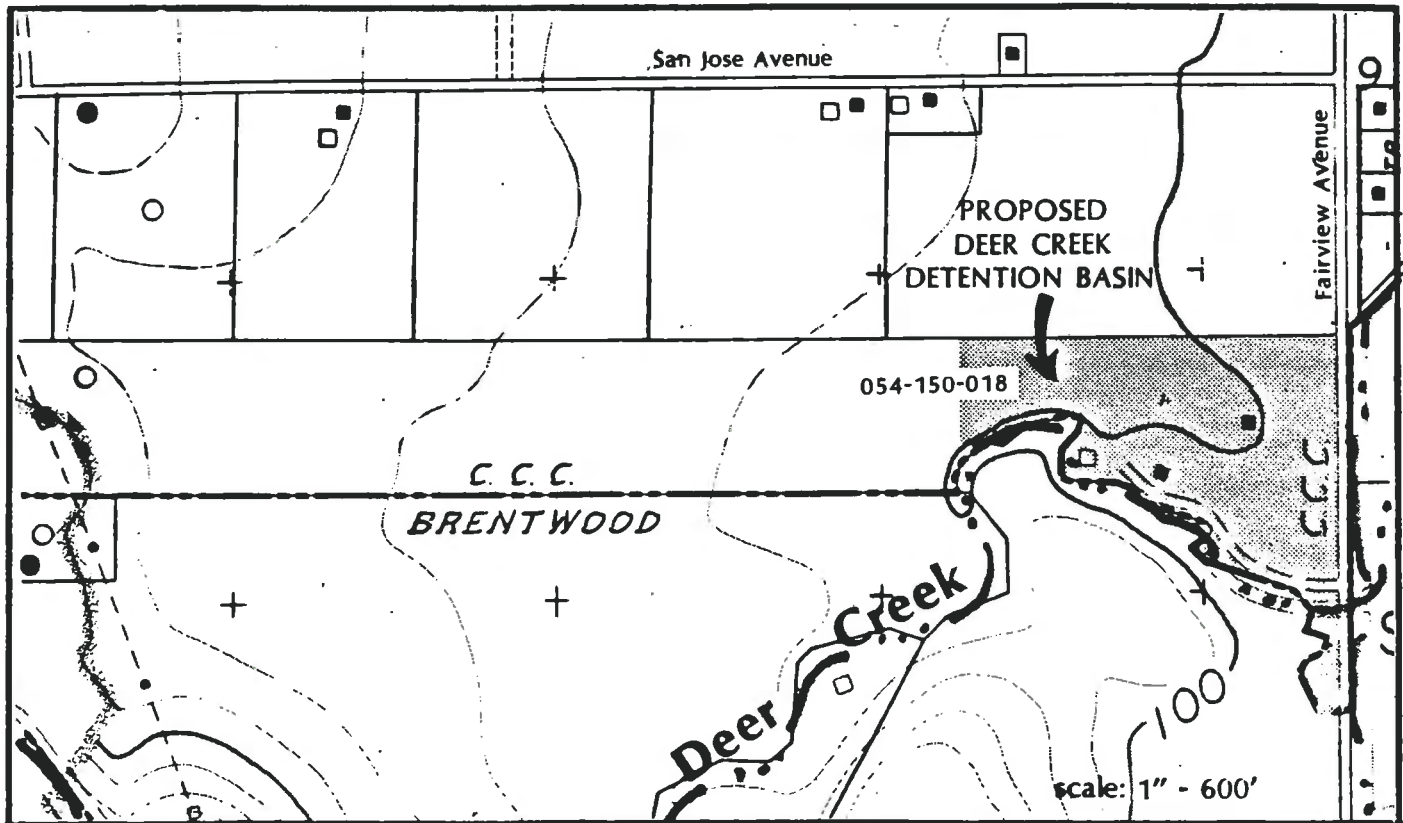
Population centers near Marsh Creek include the City of Brentwood (population 5,192), the unincorporated town of Oakley (est. population 13,000), and the southeast portion of Antioch. According to the 1986 census tract data, the population centers in and around the watershed have grown by more than 50 percent since 1980.


Construction of the proposed regional detention basins will require the acquisition of private properties. These properties can be identified as follows:

<u>Basin</u>	<u>Parcel</u>	<u>Owners</u>
Deer Creek	054-150-018	Bloomfield
Sand Creek	054-182-032	Whitmer
	-013	Maggiora
	-034	Salvo/Maggiora
	054-160-009	Castello
	-011	Lea

The location of these parcels is shown in Figure 2 on a Public Works Base Map. The proposed Dry Creek basin is on lands owned by the City of Brentwood, and expansion of the Deer Creek Reservoir may be accomplished by purchasing fee title in addition to the existing flowage easements.

Generally, the work along the Marsh Creek channel would either be done within the existing creek right of way, or land would be obtained through dedications in conjunction with approval of land development projects. Some minor private land may need to be acquired.



PARCEL/TOPOGRAPHIC MAP DEER CR & SAND CR BASINS	FIGURE:	2		MARSH CREEK WATERSHED REGIONAL DRAINAGE FACILITIES
	DATE:	3-9-90		CP# 88-69

## B. EXISTING DRAINAGE IMPROVEMENTS

A watershed work plan for the Marsh-Kellogg Watershed was prepared in 1959 by the Eastern Contra Costa Soil Conservation District, the Contra Costa Soil Conservation District, and the Contra Costa County Flood Control and Water Conservation District, with assistance from the Soil Conservation Service. The work plan proposed measures to prevent flood damage on the delta plain near Brentwood and adjoining areas. These measures included land treatment and structural measures. The structural measures consisted of six floodwater retarding structures, and the improvement or construction of 36 miles of floodwater channels. Most of these planned improvements were installed during the 1960's and early 1970's. They included a) widening portions of Dry, Deer and Sand Creeks, b) widening of Marsh Creek between its junction with Dry Creek and Big Break, and c) construction of Flood Control Reservoirs on Marsh, Dry and Deer Creeks.

Since improvements to the Marsh Creek watershed were aimed at protecting the agricultural lands in the flood plain from overbank flooding of Marsh Creek, the channel work was intended to provide a two percent level of protection (i.e., the design of the improvements was to be adequate to contain peak runoff from the 50-year event<sup>1</sup>, with 1 to 2 feet of freeboard). It was anticipated the channel would be sufficient to contain runoff from the 100-year storm with no freeboard.

## C. PROBLEMS

Floodwaters from Marsh Creek present the main problem. These floodwaters can cause substantial damage to agricultural property and residences. The main roads in the floodplain, including Highway 4, are subject to closure because of flooding thereby limiting emergency services such as fire, police and medical. Sediment damage to roads and property also results from flooding.

Damaging floods have occurred, on an average of once every three years between 1952 and 1965, and it was not uncommon to have several damaging floods in the same year. The first documented flood took place in 1952. Other large floods occurred in 1955, 1956, 1958, 1963, and 1965, with two more occurring in the period between 1965 and the present.

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1 A 50-year runoff event ( $Q_{50}$ ) is one whose magnitude will be equalled or exceeded, on average, once every 50 years.

The January 2-4, 1982 storm yielded approximately 6 inches of precipitation in the Marsh Creek watershed during a 36 hour period (highest precipitation amounts occurred in the upper portion of the watershed). This storm, which is estimated to have a recurrence interval of approximately 25 to 100 years, filled the existing Marsh Creek Reservoir to capacity. Excess flows were not detained in the reservoir; instead, they were discharged into the downstream channel via the emergency spillway. This resulted in overbank flooding at constrictions in the Marsh Creek channel (i.e. on the reach of Marsh Creek between the mouth of Dry Creek and Sand Creek).

Historically, the effect of overbank flooding has been ponding of flood waters on productive agricultural lands. Prolonged periods of inundation are especially damaging to orchards where loss of trees, as well as reduction in yields, is a frequent result. Alfalfa stands are damaged and planting of row crops can be delayed because of the saturated ground. (Delayed plantings can cause the grower to miss the cannery contract dates, making the crop worthless.) The areal extent of the flooding problem can be estimated from the Flood Insurance Rate maps (FIRM) issued by the Federal Flood Insurance Administration. The map of the lower segment of the Marsh Creek Watershed is presented in Figure 3. The acreage subject to flooding is difficult to estimate accurately because the map also shows the extent of the flood plain on both Marsh Creek and the Sacramento-San Joaquin Rivers. These Flood waters coalesce or overlap, resulting in a composite flood hazard map.

In recent years suburban development has encroached on the flood plain, and development in the lower portion of the watershed has increased flood flows. These factors, along with the inability of portions of the existing channel to pass the January 1982 storm, has triggered the Flood Control District's decision to pursue the establishment of five new drainage areas and to obtain approval for various regional drainage improvements aimed at preventing flooding on the Marsh Creek channel during peak runoff from the 100-year storm.

#### **D. SCOPING OF CONCERNS**

The Initial Study identified the following as the primary environmental issues to be analyzed by the EIR.

1. possible mercury-contaminated sediments within project areas,

2. possible growth inducing impact associated with drainage improvements that eliminate a potential obstacle to development,
3. possible cumulative impacts of the entire project, i.e., regional drainage plan, drainage fee ordinance, formation of drainage areas, and
4. possible physical environmental impacts resulting from construction of individual drainage improvements.

#### **E. DESIGN CRITERIA**

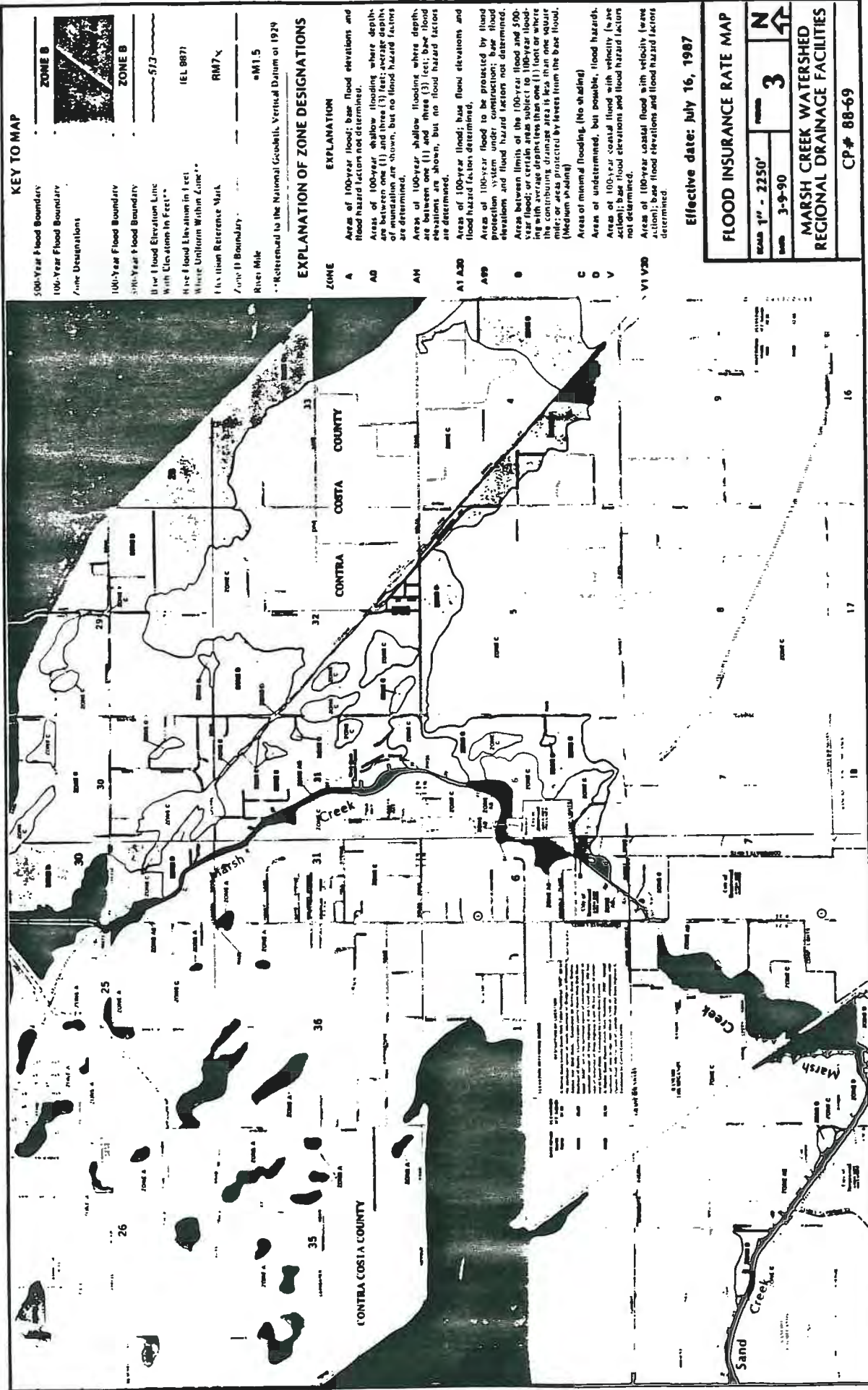
The detention basins have been sized to contain the 100-year storm ( $Q_{100}$ ) having a duration of 6 hours. Other factors influencing design are as follows:

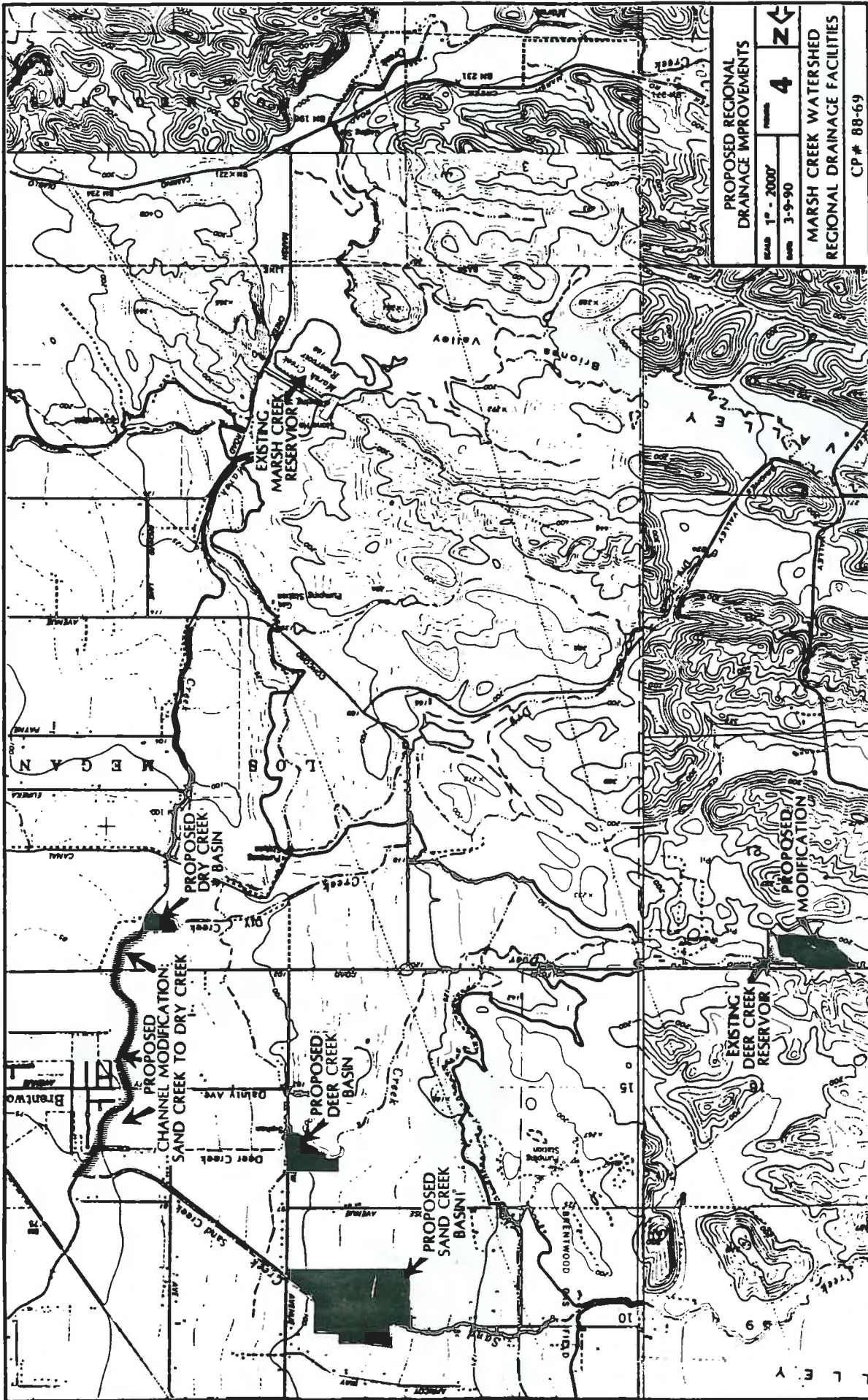
1. Accomplish the flood control objectives of the District at a minimum cost to the property owners in the watershed.
2. Minimize disturbance to improved properties along the channel.
3. Minimize disturbance to significant vegetation along the channel.
4. Minimize cost of utility and road realignment.

#### **F. DRAINAGE FEE ORDINANCE**

The Flood Control District estimates that the cost of the proposed improvements will be \$13.3 million at 1995 prices. A breakdown of these costs is presented in the Engineers Report (see Appendix B).

Funding for the proposed improvements would be based on a one-time uniform fee per square foot of impervious surface created. The proposed fee is \$0.17/Ft<sup>2</sup> within the proposed drainage areas. This rate was calculated by dividing the total estimated project cost by the total amount of impervious surface estimated to be created in a specific drainage area by future development. The fees are required to be paid at the time of development when the Final map is processed by Contra Costa County and the Cities of Antioch and Brentwood. No fees would be required from owners of existing developed lots in the watershed.





## G. PROPOSED PROJECT

The recommended drainage plan proposes that Marsh Creek remain as is between its outlet at Big Break and the junction at Sand Creek. The capacity of Marsh Creek downstream of the junction with Sand Creek is 2,300 cfs including an allowance for freeboard. The hydrologic study prepared by the Flood Control District predicts that peak flows from the 100-year storm on this reach of the channel will be 3,500 cfs. Therefore, the proposed plan calls for detention basins on Sand, Deer, and Dry Creeks, as well as increasing the capacity of the existing Deer Creek Reservoir. These facilities will moderate the outflows from the respective watersheds so that the combined discharges do not exceed the capacity of Marsh Creek downstream from its junction with Sand Creek. In addition it was found that approximately 7,000 linear feet of Marsh Creek between Sand and Dry Creeks are inadequate to carry the discharge from a 100-year storm under existing development levels. Even with the proposed basins in place, Marsh Creek needs to be widened between Sand and Dry Creeks.

Figure 4 shows the location of the planned improvements, using the U.S. Geological Survey Topographic Map as a base. Figures 5, 6, and 7 are conceptual plans showing the design of the Dry, Deer and Sand Creek Basins. Figure 8 shows the location of the area to be regraded to increase the capacity of the existing Deer Creek Reservoir, and Figure 9 shows typical sections for the segment of Marsh Creek that is to be improved.

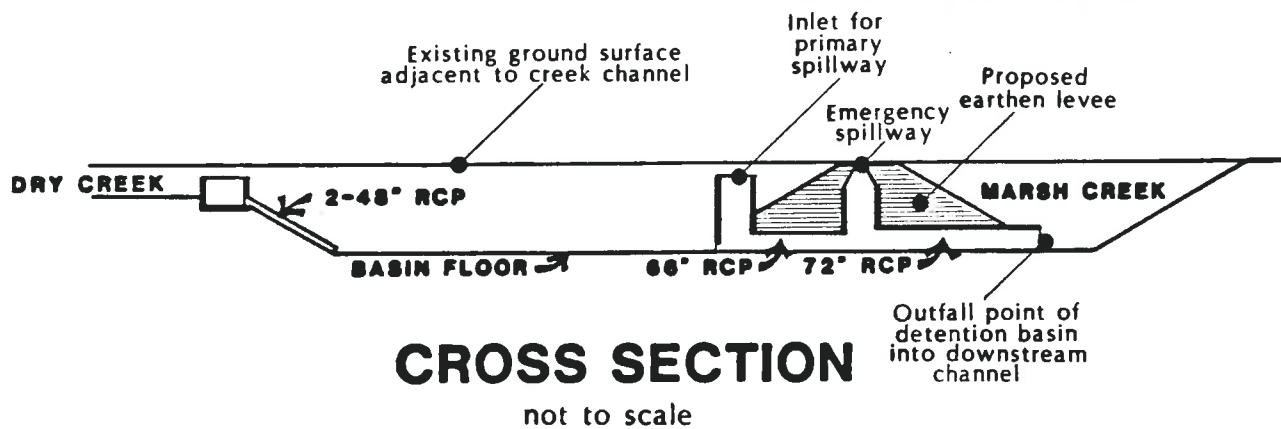
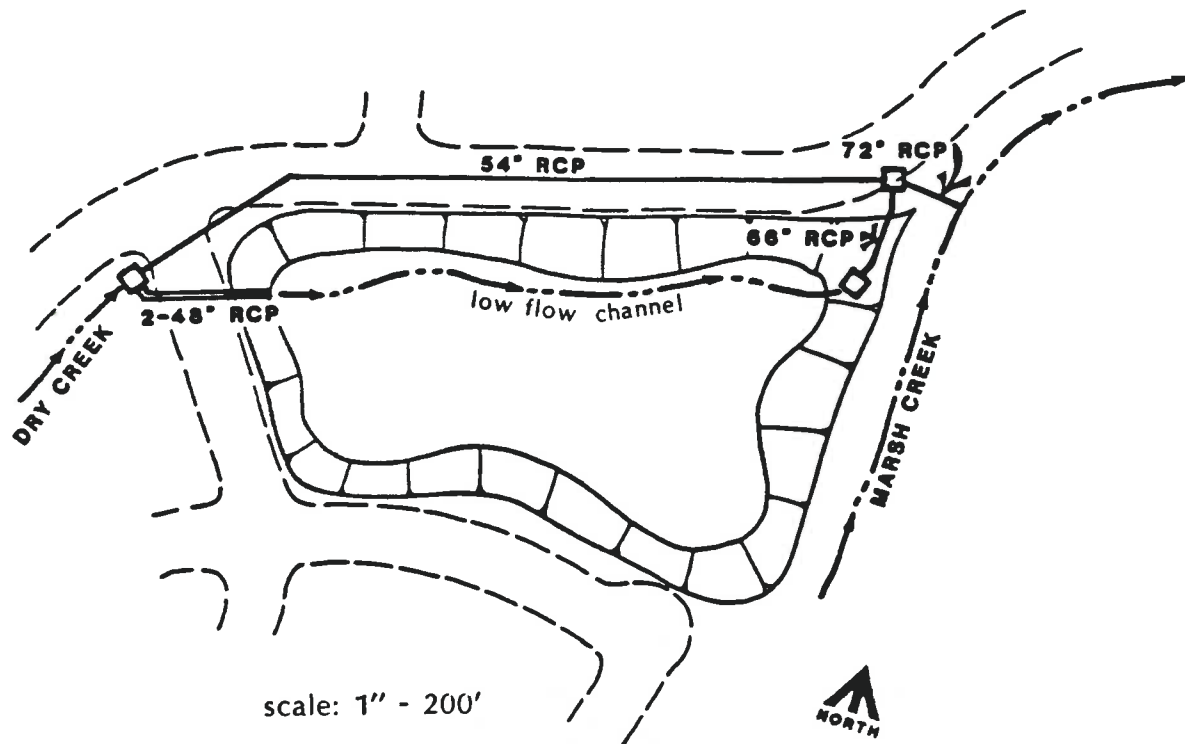
## Dry Creek Basin

Figure 5 is a schematic of the Dry Creek basin and typical section. The basin will have a surface area of 3.5 acres and a storage capacity of 21.3 ac. ft.<sup>2</sup> The side slope (ss) will have a gradient of 5:1 (horizontal to vertical). The total surface area of the the basin site is 4.0 acres. As proposed, the inlet pipes are twin 48" diameter culverts. The outlet pipe will be a 66" diameter culvert. The schematic indicates a 54" reinforced concrete pipe (RCP) in the subdivision street north of the basin. This storm drain pipe will allow low flows to bypass the basin. Runoff would only enter the Dry Creek basin during severe storm events that exceeded the capacity of the 54" diameter culvert.

The typical section indicates the ground surface adjacent to the basin will be at elevation +88 feet, and the floor of the basin will be at elevation +80 feet. A basin routing study indicates that for the design storm (100-year storm of 6-hour duration) the maximum water depth is 6.9 feet.

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<sup>2</sup> The units used to describe the volume of runoff and/or capacity of detention basins is the acre foot (ac. ft.). One (1) ac. ft. is the volume of water required to cover one acre to a depth of one foot.



CONCEPTUAL PLAN & SECTION  
DRY CREEK BASIN

FIGURE

**5**

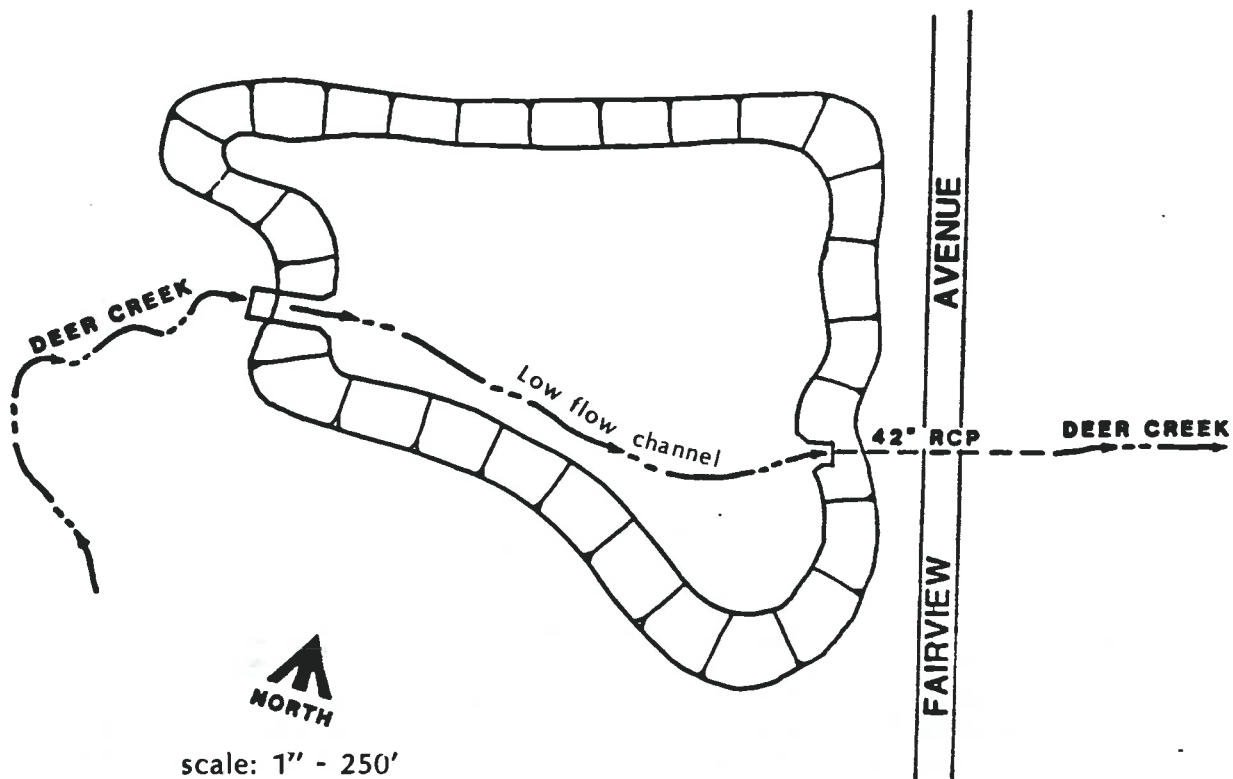
DATE: 3-9-90

MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

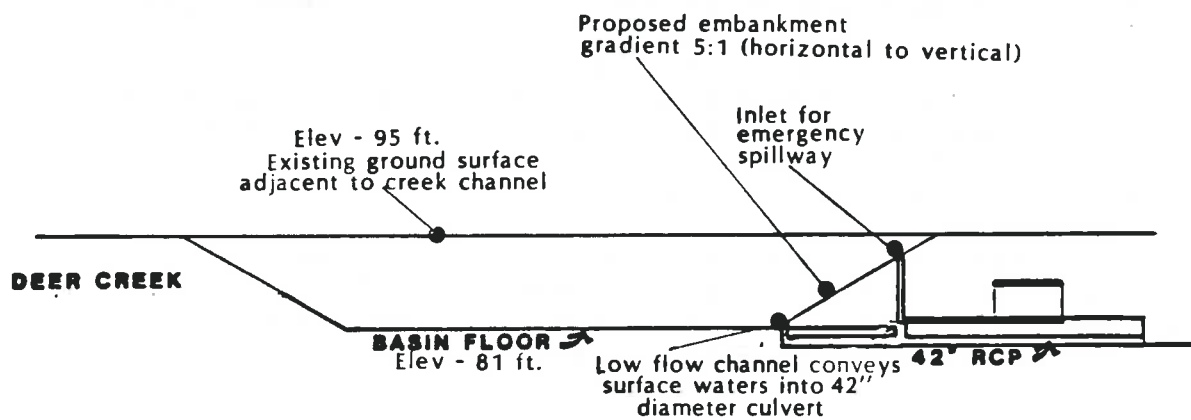
CP# 88-69

### Deer Creek Basin

Figure 6 is a schematic of the Deer Creek basin with typical section. The basin property is to have an area of 12.5 acres, and the surface area of the basin is to be 11.5 acres. The basin will have a storage capacity of 126.1 ac. ft., and it will be constructed with side slopes of 5:1. The typical section indicates the basin will be 14 feet deep. The 100-year water elevation will be +89 feet, so the basin design provides for 6 feet of freeboard (maximum water depth 8 feet). The inlet for the emergency spillway will be at elevation +93 feet.



## PROPOSED DEER CREEK BASIN



## CROSS SECTION

not to scale

CONCEPTUAL PLAN & SECTION  
DEER CREEK BASIN

FIGURE

6

DATE: 3-9-90

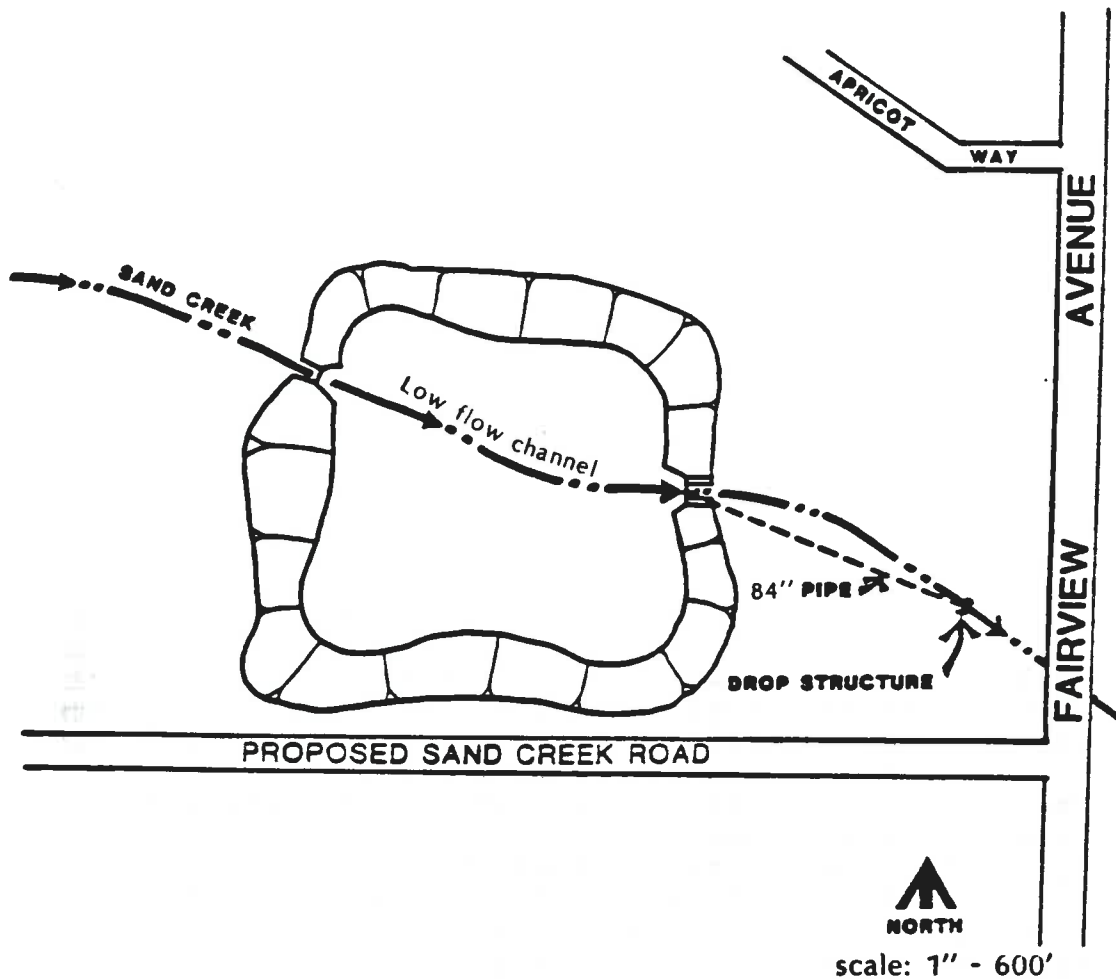
MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

CP# 88-69

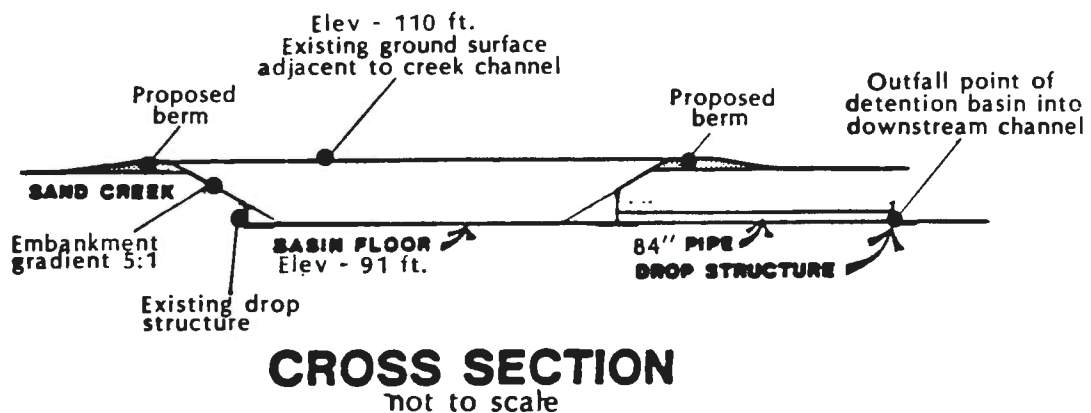
### Sand Creek Basin

Figure 7 is a schematic of the Sand Creek basin with typical section. The basin will be on a 92-acre site. The basin itself is to have a surface area of 60 acres and a storage capacity of 629 ac. ft. The remaining 30 acres will be used for permanent stockpiling of the soils excavated from the basin. The outlet pipe would have an 84" diameter, and the floor of the basin would be at elevation +91 feet. The typical section shows the flow level (FL) of the outlet pipe would be at elevation +91 feet, and the flow level of the inlet pipe would be at elevation +100.0 feet. The floor of the basin would be 19 feet lower than the surrounding ground, and a 2 to 3 foot deep low flow channel would be notched on the floor of the basin to prevent the establishment of marshy conditions. Rip rap, gabions, or other suitable type of bank protection would be used below the inlet pipe to prevent erosion.

The 100-year water elevation would be +104 feet, so basin design provides for 6 feet of freeboard. The emergency spillway elevation is +108.5 feet. The embankments of the basin would have a gradient of 5:1 (horizontal to vertical).



## PROPOSED SAND CREEK BASIN



CONCEPTUAL PLAN & SECTION  
SAND CREEK BASIN

FIGURE

7

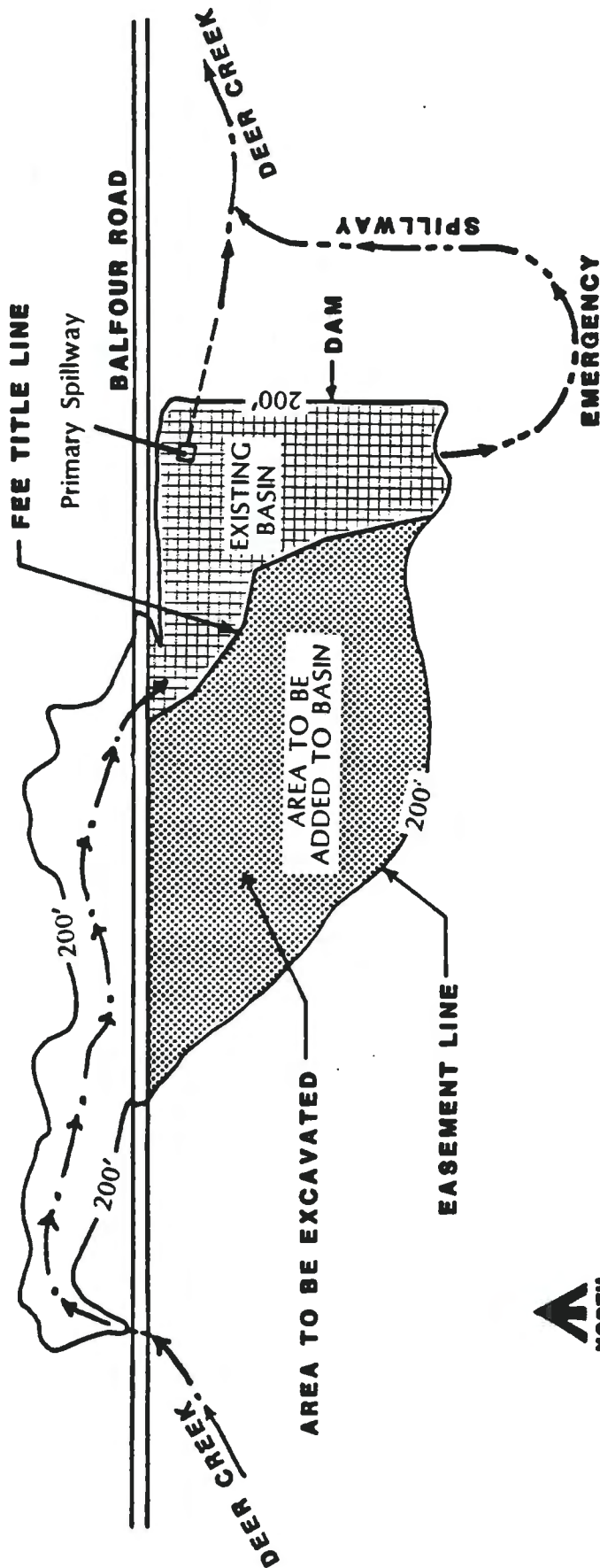
DATE: 3-9-90

MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

CP# 88-69

### Existing Deer Creek Reservoir

The existing facility is located in the upper reaches of the Deer Creek watershed, just south of Balfour Road (see Figure 8). This existing facility does not have sufficient capacity to detain peak runoff from the 100-year, 6-hr storm. The proposed project includes excavating the basin and placing fill on the perimeter. The cross-hatched area in Figure 8 (labeled "existing basin") is owned by the Flood Control District. This area would not be modified. The stippled area (labeled "area to be added to the basin") is an existing flowage easement. The Flood Control District proposes to purchase the property shown in a stipple pattern, and grade it to provide capacity for the 100-year flood. The precise limits of grading are not defined. However, the amount of required earthwork is minor, and all earthwork would be balanced on site. The project would not involve disruption to Balfour Road, or any existing improvements, and no earthwork would be needed on the north side of Balfour Road.



## DEER CREEK RESERVOIR

### PROPOSED DEER CREEK RESERVOIR MODIFICATION

SCALE: 1" = 500'

FIGURE:

8

DATE: 3-9-90



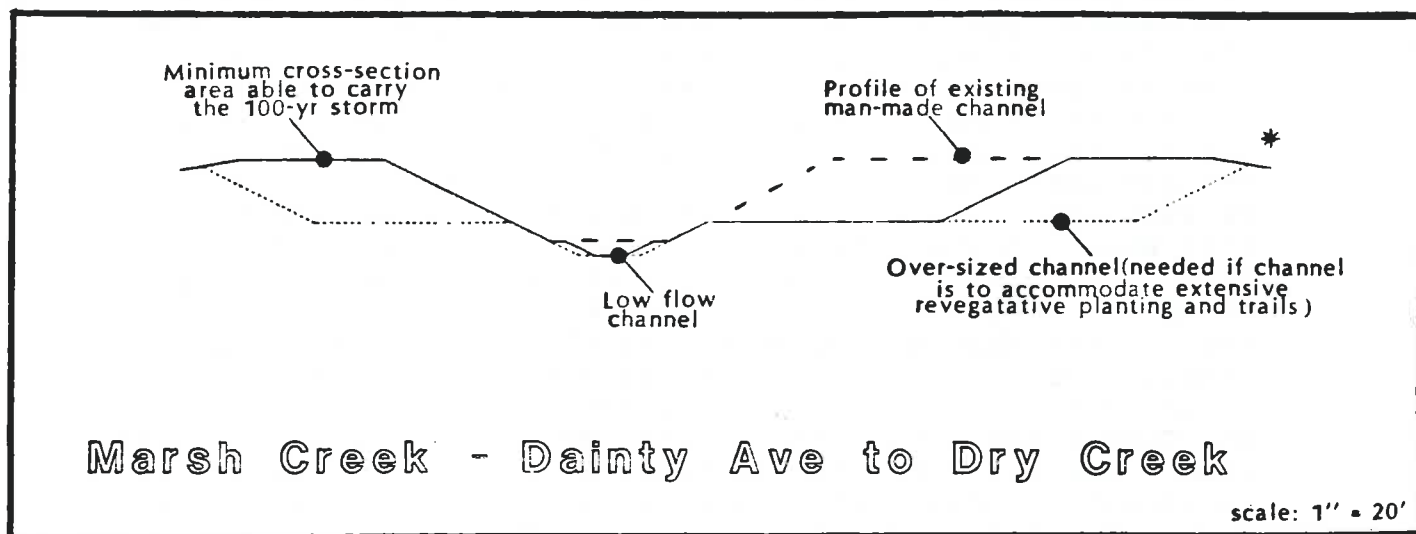
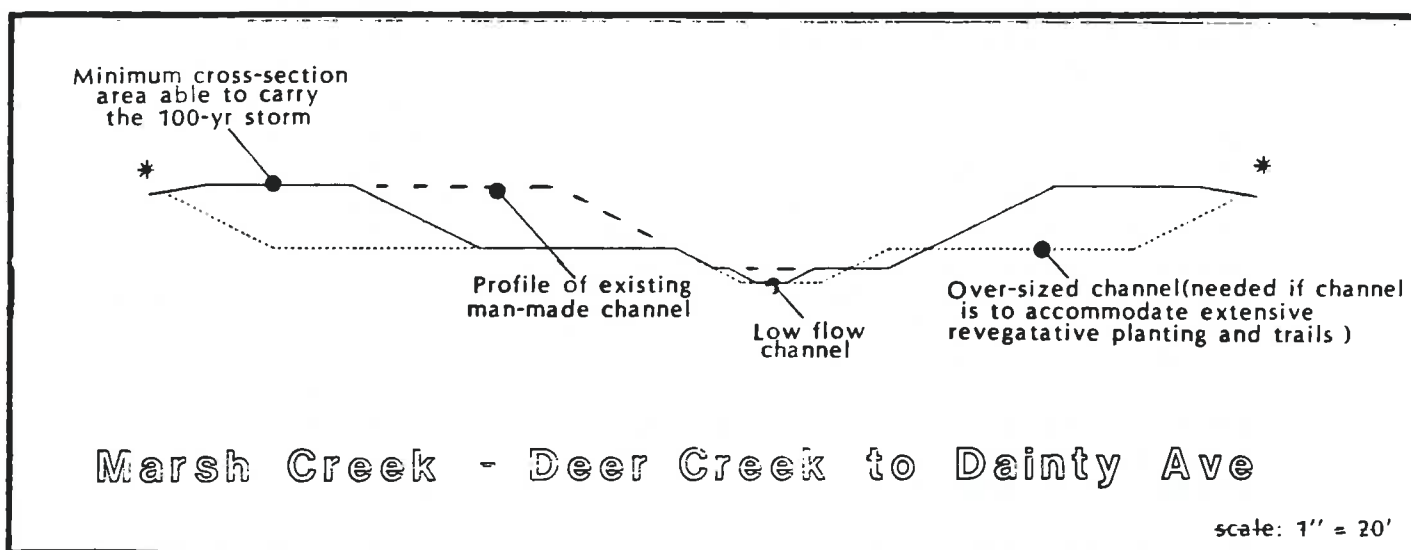
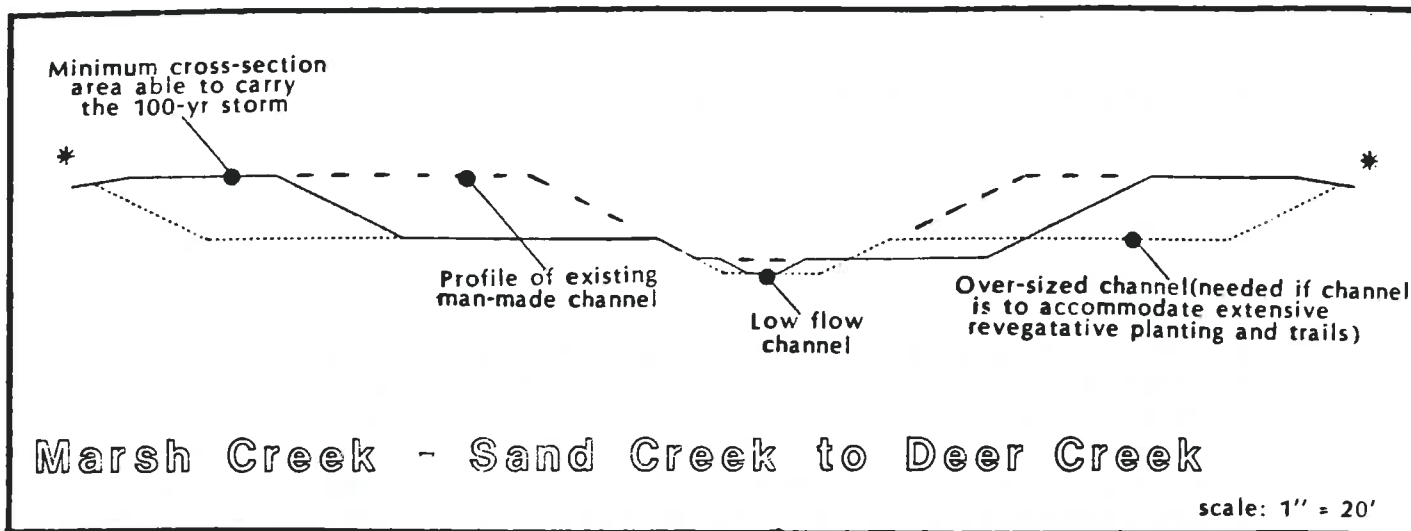
MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

CP # 88-69

### Marsh Creek Channel Improvements

Approximately 7000 lineal feet of the Marsh Creek channel has inadequate capacity to carry peak runoff from the 100-year, 6-hr. storm. Figure 9 presents three (3) typical sections that indicate the nature of the planned improvements. A dashed line indicates the existing cross-section; a solid line indicates the minimum cross-section area necessary to carry peak runoff from the 100-year storm; and a dotted line indicates the possible configuration of an oversized channel, if the channel is to accommodate extensive revegetative plantings and/or trails. The primary effect of the grading will be to lower the elevation of the maintenance roads on one or both sides of the channel. When completed, any lowered maintenance roads will be on benches elevated approximately five (5) feet above the floor of the low flow channel. During intense rainstorms the maintenance roads will be inundated. However, routine maintenance is carried out during the dry, summer months, and the maintenance roads are not paved. Although they will not be usable during portions of the winter rainy season, they are seldom needed at that time of year, and the flood damage to the maintenance roads would be negligible.

Whatever channel configuration is selected, nearly all of the earthwork in the channel right-of-way will be cut. The excavated material will be hauled offsite and used as engineered fill. Because the area adjacent to these reaches of channel is still developing, some of the excavated material could be used in adjacent projects. In fact, developers would be given the opportunity to perform earthwork in the channel right-of-way and use the excavated material in their projects in lieu of paying drainage fees, or credited toward payment of drainage fees. Figure 9 indicates that when the earthwork along the channel is completed, the project areas will have capacities of 1750 and 2000 cfs, which is adequate to carry peak flows without overbank flooding.



TYPICAL SECTIONS MARSH CREEK CHANNEL	FIGURE <b>9</b>	MARSH CREEK WATERSHED REGIONAL DRAINAGE FACILITIES
	DATE: 3-9-90	CP# 88-69

### III. ENVIRONMENTAL INVENTORY AND ANALYSIS

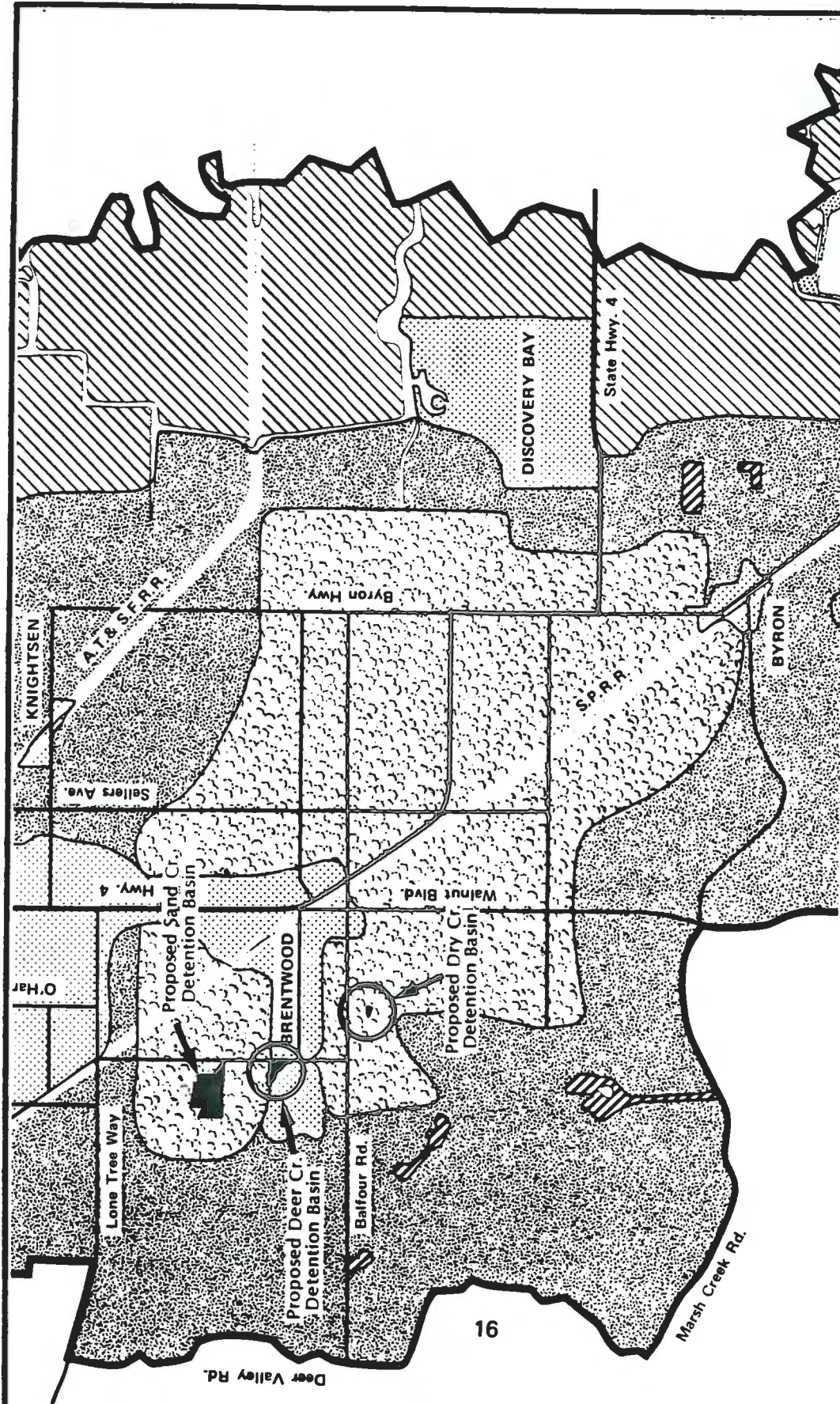
#### A. PLANS, ORDINANCES AND POLICIES

##### SETTING

##### 1. Background

In 1978, Contra Costa County adopted the East County Area General Plan. A portion of the land use element diagram from the plan is presented in Figure 10. This map used Deer Valley Road and Marsh Creek Road to define the southwest corner of the planning area. For the portion of the Marsh Creek watershed that is further west and southwest, the 1963 Contra Costa County General Plan land use diagram was, and continues to be, the operative plan. A primary goal of the East County General Plan was to control development and protect an agricultural core area (i.e. area of prime farmland) located south and west of Brentwood. This goal was implemented by creating an agricultural core land use designation which imposed strict development standards. The rolling hills to the south and west of the Agricultural Core were designated Agriculture-Residential (5 acre minimum parcel size). In the Marsh Creek watershed to the west of the planning area, the lands are designated for agricultural and park uses by the 1963 County General Plan, except for two small islands of development: a) Marsh Creek mobile home park, located on the north side of Marsh Creek Road, west of its intersection with Deer Valley Road, and b) an area of 1-acre lots located in the southeast quadrant of the Marsh Creek Road/Morgan Territory Road intersection.

During the past three years, Contra Costa County has been in the process of updating the 1963 general plan. A draft of the general plan has been prepared, including a draft general plan land use map (see Figure 11). This map recognizes the uses assigned by the adopted Antioch and Brentwood general plans within their respective spheres of influence. Within the rolling topography of the Diablo Range, proposed land use designations are AL (agricultural lands) and PR (parks and recreation). The agricultural core (AC) is smaller than that shown in the 1978 East Contra Costa County Area General Plan. The Draft Contra Costa County General Plan (1989) shows the agricultural core to be bounded on the west by the Marsh Creek channel and on the north by the main irrigation canal. The three (3) proposed detention basins are located in the Brentwood sphere of influence, and the proposed Dry and Deer Creek basins are in the corporate limits of Brentwood. According to the Brentwood General Plan, the Dry Creek basin site is designated "single family residential - high density" (5.0 to 7.3 DU/net acre), The Deer Creek basin is designated "business park" (BP), and the Sand Creek basin is designated "single family residential - high density" (SH) and "Single Family Residential - Low Density" (SL).



0 scale in feet 8,000

# LEGEND

- |  |                      |  |                           |
|--|----------------------|--|---------------------------|
|  | Planned Community    |  | Agriculture - Recreation  |
|  | Recreation Community |  | Agriculture - Residential |
|  | Industry             |  | Public & Semi-Public      |
|  | Recreation           |  | Water                     |
|  | Agricultural Core    |  | Area Boundary             |

EAST COUNTY  
AREA GENERAL PLAN(1978)

FIGURE: **10**

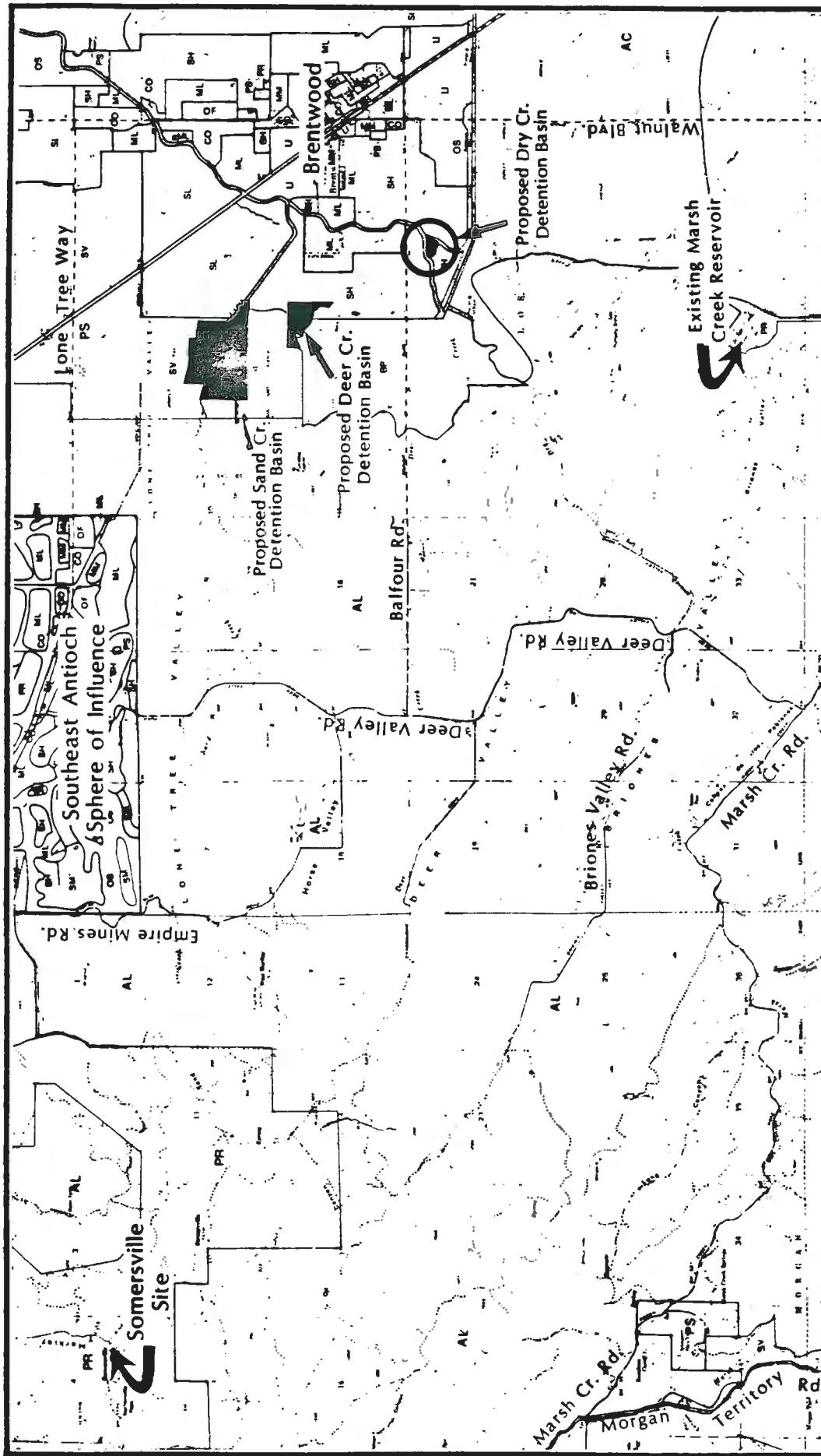
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MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

CP# 88-69



DRAFT CONTRA COSTA COUNTY GENERAL PLAN(1989)		
SCALE: 1" - 0.5 mi.	FIGURE: 11	N ↑
DATE: 3-9-90		
MARSH CREEK WATERSHED REGIONAL DRAINAGE FACILITIES		
CP# 88-69		

#### COMMERCIAL AND INDUSTRIAL

CO Commercial  
OF Office

#### OPEN SPACE AND OTHER USES

PS Public/Semi Public  
PR Parks and Recreation  
OS Open Space  
AL Agricultural Lands  
AC Agricultural Core

#### SINGLE FAMILY RESIDENTIAL (UNITS PER NET ACRE)

SV Very Low (1.0 to 2.9)  
SL Low (1.0 to 2.9)  
SM Medium (3.0 TO 4.9)  
SH High (5.0 to 7.3)  
U Brentwood Area

#### MULTIPLE FAMILY RESIDENTIAL (UNITS PER NET ACRE)

ML Low (7.4 to 11.9)  
MM Medium (12.0 to 20.9)

In general, the land uses shown on the Draft County General Plan reaffirm open forms of land use in the Diablo Range, and acknowledge the adopted City General Plans of Antioch and Brentwood.

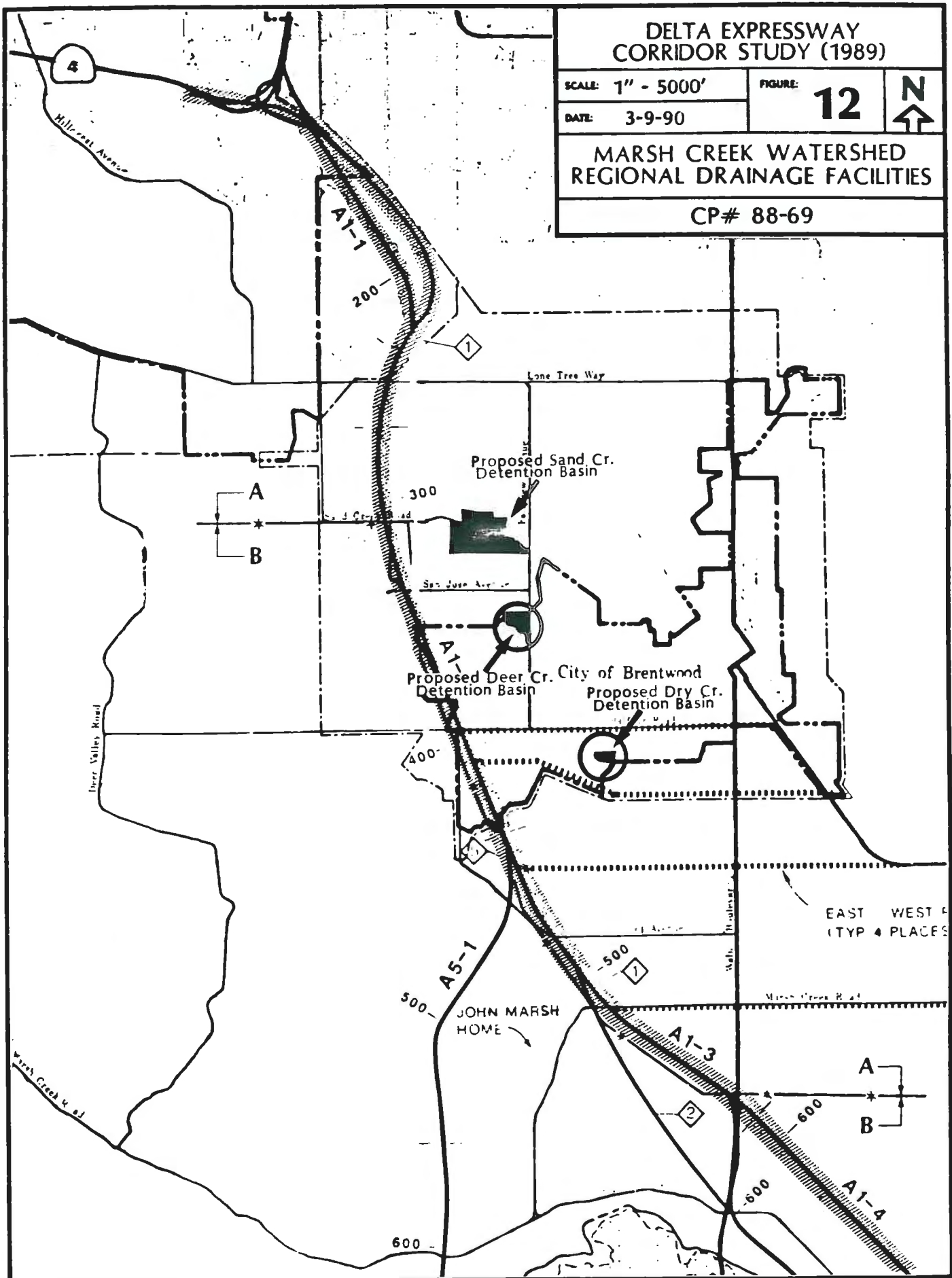
## 2. Delta Expressway

As a means of reducing traffic volumes and congestion on State Route 4, through Brentwood and Oakley, a limited access arterial street (the Delta Expressway) will be constructed. The proposed alignment is shown in Figure 12. It will pass west of the core area of Brentwood. Through traffic on State Route 4, along with some local traffic is expected to use this route when it is completed. As Figure 12 indicates, the Delta Expressway will pass to the west of the three proposed detention basins, and east of the existing Deer Creek Reservoir. It will initially be constructed as a two-lane roadway, but the right-of-way will be sufficient to allow eventual widening to six lanes with a median. The Flood Control District proposes to realign Sand Creek Road between Fairview Avenue and the Delta Expressway. The current plans are for Sand Creek Road to parallel and approximately coincide with the south boundary of the proposed Sand Creek detention basin. Moreover, the Flood Control District has discussed road improvement plans with representatives of the City. The basin site shown in Figure 7 provides sufficient area to allow space for the relocation of the Sand Creek Road right-of-way along the south boundary of the basin site. It appears likely that grading for the basin and the segment of the road on the basin site could be coordinated. Construction of the new Sand Creek Road is not a part of the Flood Control District's drainage improvement project, and therefore is beyond the scope of this EIR.

With regard to the Delta Expressway, the design of road improvements is at an early stage. However, it is anticipated that creek crossings will be culverted. The conduit would be sized so that the road improvements would not obstruct or modify the direction of runoff. The only effect of the road on drainage is a minor (insignificant) increase in the volume of runoff due to the increase in impervious surface. In summary, the construction of the detention basins will not interfere with the Delta Expressway.

## 3. Land Use Assumptions

The intent of the project is to convey peak runoff from the 100-year storm through the project area without overbank flooding on the Marsh Creek channel, or Dry, Deer and Sand Creeks below the proposed detention basins. Analysis of future development patterns is a basic step which must precede hydrologic analysis, because land uses and densities affect both infiltration rates and the speed of runoff. In



their analysis, the District considered existing land use patterns, the extent of permanent open space in the watershed, and the current general plans of Brentwood, Antioch and Contra Costa County. Most of the Marsh Creek watershed is rugged terrain in the Diablo Range which is designated for open forms of land use by both the existing and draft County General Plans. The development outside of Brentwood's sphere of influence has little effect on the design of the detention basins because nearly all of the watershed above the proposed Dry Creek and Deer Creek basins are designated for open space uses. There will be some business park development in Brentwood that will drain to the Deer Creek basin. Additionally, Antioch is currently processing development applications along the Lone Tree road corridor, which is within the Sand Creek watershed. The Sand Creek basin is sized to accommodate runoff from these pending land development projects.

#### 4. Local Regulatory Agencies

County and Cities. The Drainage Areas that would be established are in Antioch and Brentwood, as well as the unincorporated area. The Flood Control District is the lead agency for the Environmental Impact Report, and is the local sponsor of the project. It presently owns right-of-way along the channel of Marsh Creek and Sand Creek, and the Dry Creek basin site is a proposed neighborhood park in the City of Brentwood. If the project is approved, the responsibilities of the District include the following:

- a) acquire the necessary permits, licenses and other entitlements to install the project,
- b) acquire all land rights, including arranging for the necessary surveys and appraisals,
- c) arrange for road and utility modifications,
- d) provide the engineering services needed to design and install the project,
- e) administer the construction contracts,
- f) irrigate and maintain all plantings during a two-year establishment period, unless the responsibility is taken over by the City of Brentwood, and
- g) assume long-term maintenance responsibility for the drainage improvements.

Contra Costa County Mosquito Abatement District. The CCCMAD monitors and controls mosquito populations within the Marsh Creek watershed. Mosquito problems have been effectively controlled by introducing mosquito fish, which eat mosquito larvae. Marshy areas containing standing water, roadside ditches, etc., would be of concern to the District.

Bay Area Air Quality Management District. The BAAQMD monitors and enforces air quality standards. The earthwork necessary to construct the project would be a source of particulate matter during the construction period.

## 5. State Agencies

California Department of Fish and Game. Any proposed activities that would substantially divert or obstruct the natural flow, or substantially change the bed, channel or bank of any stream, are regulated by Sections 1601-1603 of the Fish and Game Code. The provisions of this section are intended to protect and conserve California's fish and wildlife resources. One of their concerns is the cumulative impact of stream channel "improvement" projects, including detention basins, on the wildlife habitat value of creeks and the loss of riparian vegetation in Contra Costa County.

California Regional Water Quality Control Board. As a Board of the Resources Agency, the California Regional Water Quality Control Board, Central Valley Region, evaluates water quality impacts within the Marsh Creek watershed. Their primary concerns include erosion and sedimentation problems, along with surface drainage. The CRWQCB has not commented on the Notice of Preparation.

## 6. Federal Agencies

Corps of Engineers. A permit may be required from the Corps of Engineers (COE) under Section 404 of the Clean Water Act. The Corps of Engineers did not respond to the Notice of Preparation, and they would not have responsibility for funding construction or maintenance of improvements.

## ENVIRONMENTAL ANALYSIS

### 1. Land Use

Impact. The Flood Control District's land use assumptions are based on no significant development upstream from the existing Marsh Creek, Dry Creek and Deer Creek Reservoirs, and buildout of the Brentwood and Antioch areas under the current general plans. In the future, land use planning decisions may change in these watersheds.

Mitigation. The Flood Control District used the current 1981 City of Antioch Land Use Plan, the 1983 City of Brentwood Land Use Plan, and the 1978 East County Area General Plan. If urbanization proceeds past these established levels of development, additional flood control improvements may be needed.

The proposed Dry Creek and Deer Creek basins have little potential for future modification to increase capacity. The Sand Creek Basin could possibly be expanded. If land uses change, additional basins may be required higher in the watershed. The County should consider the feasibility of large basins in any upstream land development projects that are on lands currently considered to be open space.

## B. HYDROLOGY AND FLOOD HAZARDS

### 1. Design Criteria

The purpose of establishing drainage areas is to control flood problems/flood damage. The process leading to the establishment of drainage areas is to first identify the extent and nature of the flooding problem. Next, hydrology studies are undertaken to characterize the peak flood flows for the "design storm".

The standards of the Flood Control District require that drainage improvements to watersheds of greater than four (4) square miles be designed to contain the 50-year storm with freeboard<sup>3</sup>. Ordinarily, open earth channels are designed with 1 to 2 feet of freeboard, so the channels have built-in safety factors. Normally, the freeboard is adequate to contain peak discharge from the 100-year storm without over-bank flooding. Another function of the free-board is to ensure that the channel has adequate capacity to carry the design storm, even if it has collected some sediment on the floor of the channel. For the proposed project, the design storm is a 100-year rainstorm with a 6-hour duration.

Since the proposed regional drainage facilities are intended to control flooding on Marsh Creek, which has a drainage area of more than four (4) square miles, the design standard is the 50-year storm with freeboard.

The peak runoff generated by the design storm is a function of land use assumptions and other parameters. For the Marsh Creek study, the Flood Control District made two (2) computer runs for each subwatershed, based on buildout under the prevailing general plan. In each computer run, the design storm was of 6-hours duration. The amount of precipitation yielded by the storm is based on historic rainfall patterns. In the Marsh Creek watershed, the rainfall yielded by the 6-hour storm ranges from 2.42 inches at the highest elevation of the watershed to 2.1 inches in the Brentwood area.

The runoff from each of the subwatersheds is added to the flow in the main channel of Marsh Creek to determine its flows. The peak flow in the Marsh Creek channel cannot be calculated by simply adding flows from Sand Creek, Deer Creek and Dry Creek, and other tributaries, because peak

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<sup>3</sup> Freeboard is the difference in elevation between the maximum water surface elevation resulting from the design storm and the elevation of the top-of-bank.

flows from one subwatershed will not coincide (timewise) with peak flows from other watersheds. However, the computer program takes these differences in timing into account.

Concurrently, the Flood Control District established the capacity of the existing Marsh Creek channel, based on its cross sectional area, gradient, alignment and roughness. Where calculated peak flows exceed channel capacity, a flooding problem exists. To correct this problem, either the a) peak flows must be reduced, b) channel capacity increased, or c) some reduction in peak flows must be achieved in combination with channel improvements to increase its capacity at constrictions. To determine which alternative to recommend for adoption, the Flood Control District considers project costs, environmental factors and other legitimate concerns. Potential methods of controlling flooding include a) culverting Marsh Creek, b) widening the Marsh Creek channel, c) constructing a bypass (alternate) channel to carry some of the flood flows, d) construction of detention basins on the Marsh Creek channel, and e) constructing detention basins on major tributaries of Marsh Creek. Based on costs and environmental constraints, the recommended project is a combination of three (3) new detention basins on tributary streams (Dry, Deer and Sand Creeks), increase the capacity of the existing Deer Creek Reservoir, and widen the channel of Marsh Creek between its junctions with Dry Creek and with Sand Creek (see Figure 4). The sites of the proposed basins have been selected to minimize the area required for acquisition, take advantage of existing publically owned lands (Dry Creek basin site), and minimize environmental damage. In this case, the Deer Creek and Sand Creek basins are located in areas where there are existing "drop" structures. The steep stream gradient in these areas permits construction of relatively small, deep basins.

In areas of low stream gradient, it is not possible to create deep detention basins. In such areas, large shallow basins would be feasible, but they would necessitate acquisition of much larger sites to have comparable storage capacity. The result would be inefficient use of land; proportionately higher land acquisition costs; more opportunity for environmental impacts (e.g. more acreage of prime farmlands required for basin sites); and more potential conflicts between the Flood Control District staff and private property owners that may be unwilling to sell.

The proposed detention basins reduce peak flow sufficiently so that no channel work is needed on Marsh Creek downstream from its junction with Sand Creek. However, increasing the cross-sectional area of the Marsh Creek channel is still required between its junction with Dry and Sand Creeks (see Figure 9).

## 2. Precipitation

As noted previously, precipitation in the Marsh Creek watershed varies from 12.5 to 25 inches. However, seasonal rainfall totals are highly variable in the extreme. For example, in the 12 month period ending in July 1977, the total rainfall in the watershed ranged from 12.5 inches at Mt. Diablo to 7.6 inches at Brentwood. In the twelve month period ending in June 1984, the total rainfall in the watershed ranged from 23 inches at Mt. Diablo to 12 inches in Brentwood. The most severe rainstorm during the 1980's was the January 2-4 1982 storm, which had a duration of approximately 36 hours. It yielded 6.5 inches of rainfall on the watershed (5.4 inches for 24 hours and 1.7 inches for 6 hours). It is estimated to be a 25- to 100-year storm.

Figure 13 presents a rainfall map showing mean seasonal precipitation in the Marsh Creek watershed. Table I shows the amount of precipitation yielded by a 100-year storm as a function of storm duration for the various parts of the watershed.

The proposed detention basins are designed based on a 100-year, 6-hour storm. However, the 3-hour, 12-hour, 24-hour and 96-hour storms were studied, and based on a comparison of inflow to outflow, the 6-hour storm was selected. As inflow/outflow ratio increases, greater basin capacity is required. According to the hydrology study performed by the Flood Control District, the 6-hour storm represents a "worst case" event, and on that basis was selected as the design storm.

## 3. Drainage Fees

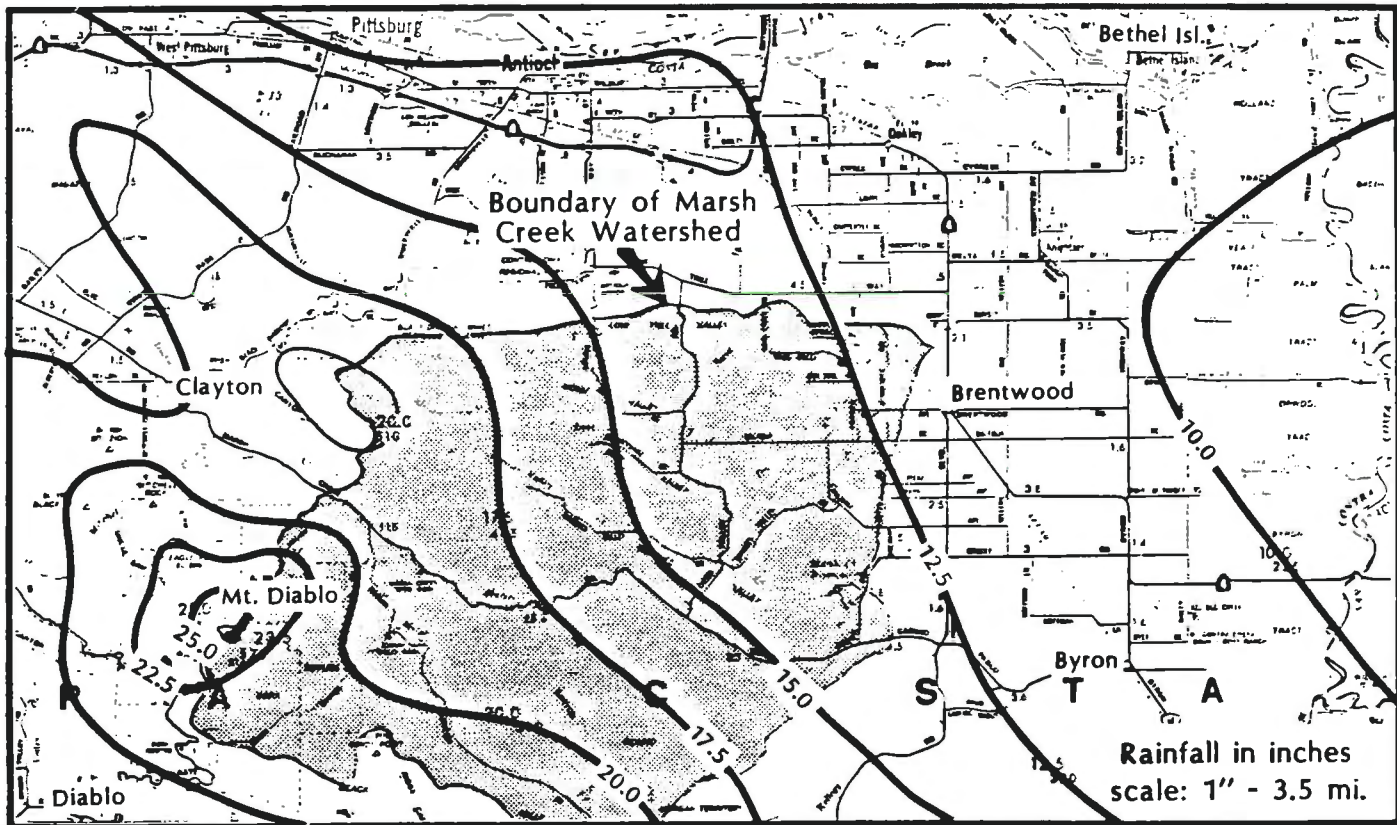
New development in the Marsh Creek watershed aggravates the existing flooding problem in the downstream area. The concept of a drainage area is to make new development funds available to support the cost of drainage improvements. In this way new development is able to mitigate the cumulative effect of increased runoff. The fee schedule is structured so that buildout of the general plan will enable funding of all proposed regional draining facilities. This method of funding treats all builders equally; the dollar amount of fees is based on the amount of impervious surface created; and it allows builders to take the cost of drainage improvements into account when planning projects.

## 4. Groundwater

The hills of the Diablo Range and upland valleys have yielded little groundwater, and there is a tendency for wells to go dry in droughty years. On the floor of the San Joaquin Valley, which includes the portion of the drainage areas that are below an elevation of +100 feet, the alluvial

TABLE I  
ESTIMATED AMOUNTS OF RAINFALL FOR 100-YEAR STORM

MEAN SEASONAL PRECIPITATION (in)	DURATION OF STORM				
	3 hr. (in)	6 hr. (in)	12 hr. (in)	24 hr. (in)	36 hr (in)
12.5	1.6	2.2	2.95	4.0	4.6
15.0	1.75	2.45	3.2	4.5	5.3
17.5	1.95	2.7	3.7	5.1	6.0
20.0	2.15	3.0	4.1	5.7	6.7
22.5	2.35	3.3	4.8	6.2	7.5



MEAN SEASONAL RAINFALL  
MARSH CR. WATERSHED

FIGURE  
**13**  
DATE: 3-9-90



MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES  
CP# 88-69

deposits are an aquifer. The groundwater is known to be hard and it contains boron. The detention basins would have a negligible effect on groundwater recharge and quality. The basins would only detain runoff during severe rainstorms, and would store water for 24 hours (or less) after each storm. There are no chemicals in the basin that would impair water quality, and the basins would have an earthen floor, so there would be an opportunity for some recharge of the groundwater resources. The regrading of the Marsh Creek channel between Dry and Sand Creeks will increase the cross-sectional area of the channel, but will not effect water quality, once vegetation is reestablished in disturbed areas. Freshly graded soils would be exposed to erosion only during peak runoff events. This will provide an opportunity to establish vegetation on freshly graded slopes and thereby control turbidity of surface runoff.

#### 5. Maintenance

The drainage improvements, including detention basins, reservoir modification, culverts and Marsh Creek channel widening are facilities that will be owned and maintained by the Flood Control District.

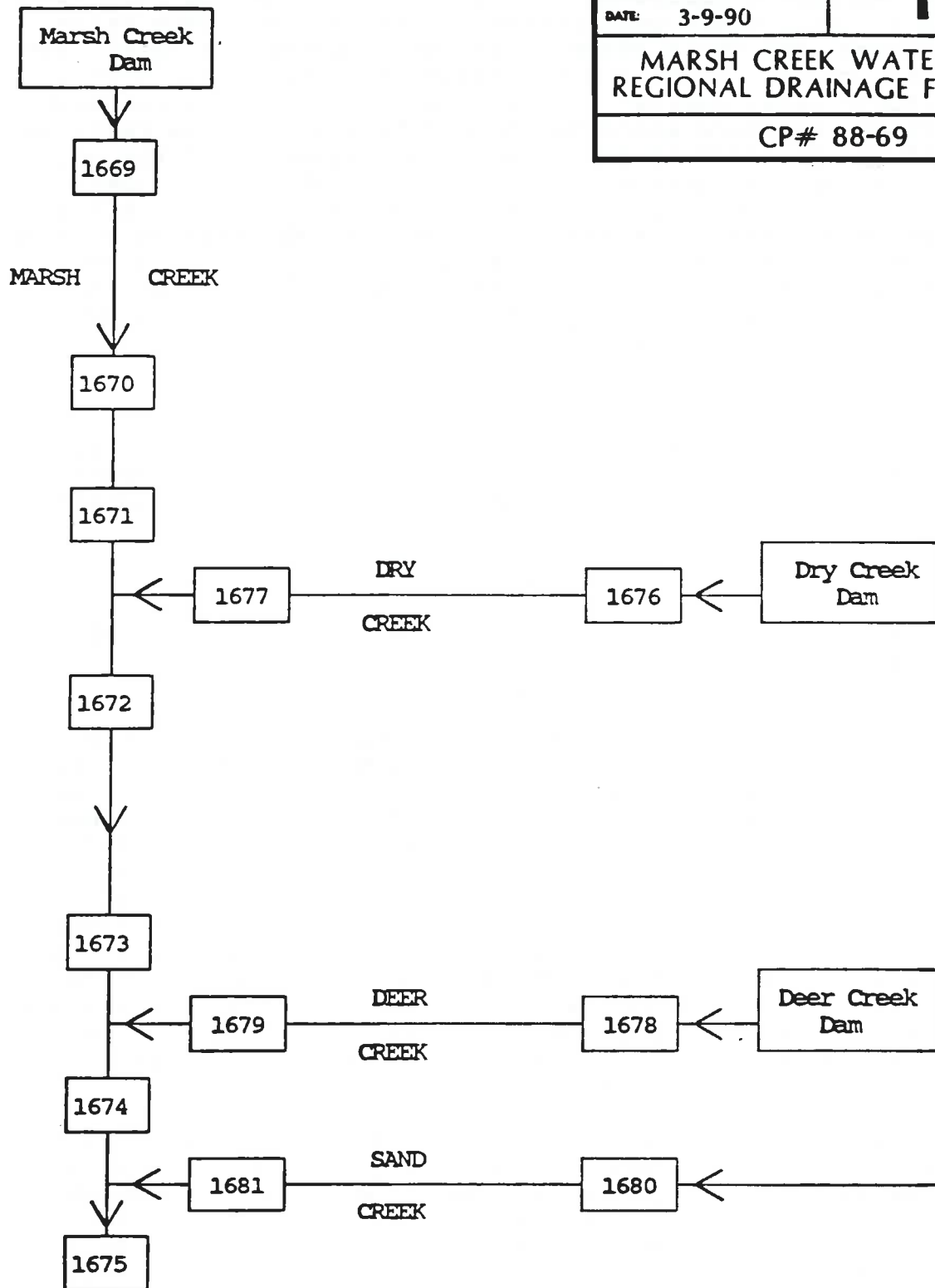
#### 6. Hydrology Calculations

The hydrology work done to date is adequate for final design purposes. However, the design of individual facilities is only conceptual at present.

Figure 14 is a schematic showing the main stem of Marsh Creek downstream from the existing Marsh Creek Dam. Also shown are existing dams on Dry Creek and Deer Creek, along with the channels of Dry, Deer and Sand Creeks. Arrows indicate the direction of flow, and boxes with four digit arabic numbers denote stations where runoff flows and volumes have been calculated. Table II presents peak flow and runoff volume data at these stations for a 100-year storm having a duration of 6 hours for buildout under the existing general plan. This table also shows the effectiveness of the proposed regional detention basins in attenuating peak flows. For example, peak flows on Marsh Creek downstream from Sand Creek are cut from 3520 to 2030 cfs (42.3% reduction in peak flows).

Table III provides information on flows 5 hours after the start of the 100-year, 6-hour design storm. It also shows the existing and proposed creek capacities. For example, note that on Marsh Creek above Deer Creek (at Station 1673), the flows would be 1920 cfs without the proposed basins. The proposed upstream basin (on Dry Creek) would reduce the peak flow to 1770 cfs (8% reduction). The existing channel in this area has a capacity of only 1050 cfs. The

INDEX SCHEMATIC TO HYDROLOGY TABLES		
SCALE: no scale	FIGURE: <b>14</b>	N ↑
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MARSH CREEK WATERSHED REGIONAL DRAINAGE FACILITIES		
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**TABLE II**  
**SUB-AREA PEAK FLOWS FOR GENERAL PLAN**  
**AND GENERAL PLAN WITH DETENTION BASINS LEVEL OF DEVELOPMENT**  
**100 YEAR, 6 HOUR STORM**

POINT	DESCRIPTION	GENERAL PLAN		GENERAL PLAN WITH BASINS	
		(cfs)	hours	(cfs)	hours
1669	Marsh Creek Reservoir Outflow	1490	14.25	1490	14.25
1670	Marsh Creek at Concord Avenue	1500	14.50	1500	14.50
1671	Marsh Creek above Dry Creek	1500	14.50	1500	14.50
1676	Dry Creek Reservoir Outflow	30	8.00	30	8.00
1677	Dry Creek above Marsh Creek	230	4.50	80	5.50
1672	Marsh Creek below Dry Creek	1530	14.50	1530	14.50
1673	Marsh Creek above Deer Creek	1920	4.75	1770	4.75
1678	Deer Creek Reservoir Outflow	100	11.00	22	10.50
1679	Deer Creek above Marsh Creek	650	4.75	190	4.50
1674	Marsh Creek below Deer Creek	2570	4.75	1950	4.50
1680	Sand Creek at Rancho Boundary	2000	5.50	2000	5.50
1681	Sand Creek above Marsh Creek	2010	5.75	350	10.50
1675	Marsh Creek below Sand Creek	3520	5.50	2030	4.50

NOTE: The hours column refers to the time after the start of the 100 year, 6-hour storm at which the peak flow occurred. The Marsh Creek Reservoir peak flows occurs approximately 15 hours into the storm, while local inflow occurs within 5 hours. This does not include inflows from land east of Marsh Creek.

**TABLE III**  
**MARSH CREEK WATERSHED FLOWS AND CREEK CAPACITIES (1)**

POINT	DESCRIPTION	GEN. PLAN (cfs)	GEN. PLAN WITH BASINS (cfs)	CREEK CAPACITY (2)	
				EXISTING (cfs)	PROPOSED (cfs)
1669	Marsh Creek Reservoir Outflow	570	570	-	-
1670	Marsh Creek at Concord Avenue	880	880	650	650
1671	Marsh Creek above Dry Creek	1260	1260	650	650
1676	Dry Creek Reservoir Outflow	20	20	-	-
1677	Dry Creek above Marsh Creek	230	60	250	250
1672	Marsh Creek below Dry Creek	1460	1310	1050	1750
1673	Marsh Creek above Deer Creek	1920	1770	1050	1750
1678	Deer Creek Reservoir Outflow	100	20	-	-
1679	Deer Creek above Marsh Creek	650	190	240	240
1674	Marsh Creek below Deer Creek	2570	1950	1250	2000
1680	Sand Creek at Rancho Boundary	2000	2000	1590	1590
1681	Sand Creek above Marsh Creek	2010	110	1590	1590
1675	Marsh Creek below Sand Creek	3520	2030	2400	2400

- (1) This table compares flows throughout the Marsh Creek Watershed based on flows 5 hours after the start of the 100 year, 6-hour design storm.  
(2) Creek capacities apply to existing improved and proposed improved creek conditions. This does not include inflows from land east of Marsh Creek

proposed improvement to this reach of channel would yield a capacity of at least 1750 cfs. With freeboard, the peak flow could be passed without overbank flooding.

As previously noted, there is an existing flooding problem, and the new development that can be expected to occur within the next 20 years <sup>1</sup> will result in a significant worsening of this problem.

Table IV presents a summary of watershed infiltration rates at selected stations for the general plan buildout land use scenario. To relate these rates to land use, see Table V which presents typical infiltration rates for eight (8) land use categories. The significance of these tables is that they show how land use assumptions affect the hydrology calculations. Taken together, these tables indicate, for example, that the infiltration rate in the upper watershed of Sand Creek, above Station 1680, averages .16 under existing conditions and for general buildout. This value suggests that perhaps 90% of the watershed is open space, with perhaps 10% of the watershed developed in the R-10 zoning district. The general plan land use scenario served as the basis of design for detention basins and culverts.

TABLE IV  
WATERSHED INFILTRATION RATES  
FOR SELECTED STATIONS ALONG  
MARSH CREEK AND TRIBUTARY STREAMS

STATION <sup>4</sup>	EXISTING	GENERAL PLAN	MAXIMUM
1670	.16	.16	.16
1671	.16	.16	.10
1673	.14	.11	.09
1676	.16	.16	.09
1679	.15	.15	.09
1680	.16	.16	.14
1681	.15	.15	.08

TABLE V  
WATERSHED INFILTRATION RATES

<u>ZONING DISTRICT</u>	<u>WATERSHED INFILTRATION RATE (inches per hour)</u>
Open Space	.17 - .18
R-40 <sup>5</sup>	.14 - .16
R-20 <sup>6</sup>	.11 - .14
R-10	.08 - .11
R-6	.05 - .08
Multi Residential	.04 - .06
Industrial	.03 - .06
Commercial	.02 - .05

Source: Flood Control District adopted standards based on  
CCCFCF Impervious Area Study (1981)

- 
- <sup>4</sup> See Figure 14 for location of station  
<sup>5</sup> R-40: Single family residential (minimum parcel size  
40,000 square feet)  
<sup>6</sup> R-20: Single family residential (minimum parcel size  
20,000 square feet)

## ENVIRONMENTAL ANALYSIS

### 1. Design Criteria

Impact. The proposed detention basins are designed based on a 100-year, 6-hour storm. The 3-hour, 12-hour, 24-hour and 96-hour storms were studied. Based on a comparison of inflow/outflow ratios, greater basin capacity is required for the 6-hour storm.

Mitigation. A basin routing study should be performed during preparation of final improvement plans. The flood control improvements shall be designed to detain the runoff from the 100-year, 6-hour storm without overbank flooding.

### 2. Emergency Spillway

Impact. The schematic plans do not indicate how the emergency spillway will function, or how the downstream channel will be protected from erosion. There are potential liability problems if lands not presently subject to flooding are inundated as a result of surplus runoff exiting the basin.

Mitigation. Runoff carried by the emergency spillway shall be discharged into the downstream channel in a non-erosive manner, and the design shall protect lands that are currently free of flood hazards from inundation.

### 3. Reevaluation of Flood Hazard Maps

Impact. The FEMA flood hazard maps of the Marsh Creek watershed indicate that approximately 1500 acres are subject to inundation by the 100-year flood with the existing land use pattern. After the project is completed, the flood hazard would be eliminated. However, unless the official maps are changed, owners of properties within the designated flood prone areas would be required to purchase flood insurance, and property values could be adversely affected.

Mitigation. The Flood Insurance Rate Maps should be re-evaluated by FEMA upon completion of the flood control improvements. The District should petition for this change.

### 4. Water Quality

Impact. The proposed projects involve excavations to create basins and widening a 7000-foot reach of channel. The placement of the excavated materials are not specified at this time. Fills placed near channels may be subject to erosion.

The effects of sediment on the beneficial uses of Marsh Creek include a) interference with the activities of, and physiological damage to fish, b) decrease in storage capacity of the channel, c) alteration to the creek channel configuration, and d) degradation of aesthetic values. The detrimental effects of sediment on fish include interference with light penetration, thus making food more difficult to find, and direct damage to gill structure.

By limiting the penetration of sunlight, the sediment-related turbidity may have an adverse impact on the chemistry of the runoff. For example, microorganisms, such as algae, require sunlight to metabolize organic materials and produce oxygen as a byproduct of their activity. The byproduct oxygen contributes to the overall quality of the reservoir for fish habitat and for aesthetics.

It should also be recognized that during construction, minor concentrations of other pollutants will escape to the creek. These include a) organic material, and b) grease and oil. Each of these pollutants is discussed individually below. Organic material from clear-and-grub activities, from erosion of high organic content soils, from construction debris, and from work crew sanitation could potentially reach the creek. An increase in the content of biodegradable organic material in the creek may produce an increase in biochemical oxygen demand (BOD) with the potential for decreasing dissolved oxygen concentrations. However, three (3) conditions exist which suggest that impact on the creek due to organic matter from construction activities should be minor.

First, high inflow of organic matter would primarily occur during wet weather conditions from surface runoff, allowing for aeration and dilution.

Second, the organic matter associated with soils and grassland vegetation has either already experienced a high degree of biodegradation, or is not easily biodegraded. Therefore, a significant increase in oxygen demand would probably not occur. In addition, the quantity of highly biodegradable organic matter originating from worker sanitation would likely be insufficient to cause a noticeable impact on the creek BOD.

Third, the creek dissolved oxygen concentration is believed to be relatively high.

Oils, greases, and coatings from equipment support and maintenance activities, as well as from general equipment use, and from carelessness when working with equipment near the creek, could potentially reach the creek during rainfall events. Lubricating oils and greases, hydraulic fluids, and fuels exist on equipment surfaces by design; and leaks

and spills may occur during refueling. Also, fuels, oils and grease may drip from equipment to the ground and be brushed from equipment onto vegetation and soil during grading.

The impact of these substances on Marsh Creek water quality is estimated to be minimal unless relatively large quantities are spilled near the creek. Petroleum fuels, oils, and greases, are adsorbed into a wide variety of soil types, and solvents volatilize. The primary mechanism during construction for transport of oils, greases, and coatings to the creek would be by sediment from erosion of contaminated soils. The low solubility of most of these materials, combined with their adsorption to soils particles would result in an expected low direct effect on water quality.

Mitigation. With the use of best management practices, the amount of sediment that escapes into Marsh Creek can be kept to an acceptable minimum. Following development, within a period of 2 to 3 years, the rate of erosion should return to the predevelopment rate<sup>1</sup>. This assumes that it will take 2 to 3 years for vegetation to become fully established within graded areas, and that appropriate measures will be taken to prevent erosion at the outfall of all culverts.

If erosion is to be kept to a practical minimum, it is recommended that a revegetation and erosion control plan be incorporated into project design. The revegetation and erosion control plan should provide specific and effective measures to ensure that all graded areas are revegetated prior to the onset of winter rains.

It is recommended that earthwork on the site be limited to the dry summer season (May 1st to September 15th). Earthwork performed after September 15th should be limited to erosion control measures. All graded areas should be hydromulched and hydroseeded, or otherwise stabilized by October 1st. Any fertilizers in the mulch should be approved by the San Francisco Bay Regional Water Quality Control Board. The waters exiting the detention basin should be discharged into the downstream channels in a non-erosive manner.


Fills should be compacted in accordance with their intended uses. Groundcover, trees and shrubs should be planted on spoils piles, and on the flanks of levees that face public roads. All plantings should be irrigated during establishment (maximum two years). Primarily drought-tolerant, native species should be used. Graded areas within the basins should be hydromulched and hydroseeded with grasses and forbs to control erosion and discourage the establishment of undesirable plant species.

## C. GEOLOGY, SEISMICITY AND SOILS

### SETTING

#### 1. Geology

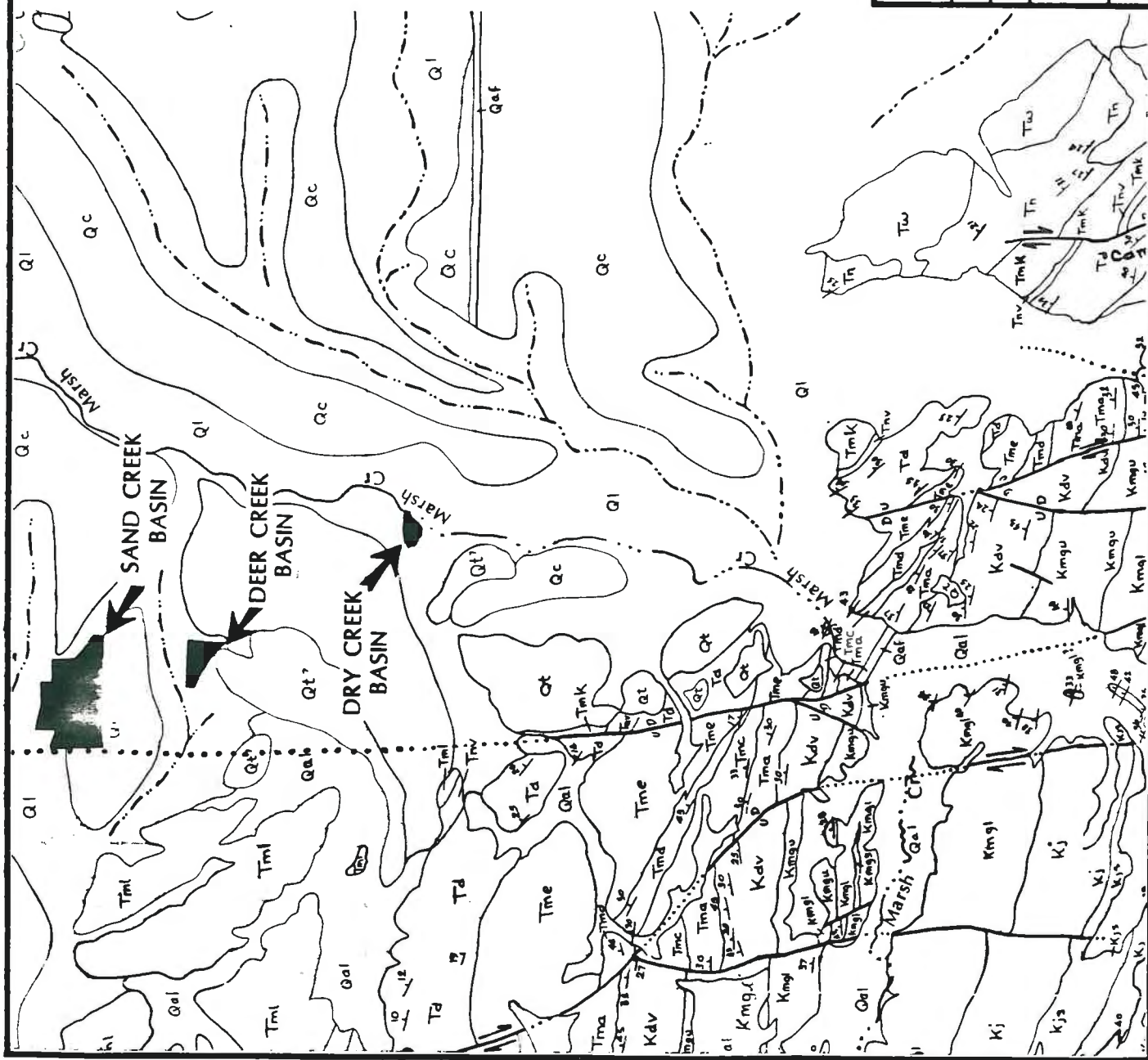
Bedrock Geology. The primary geologic map of the project is that of Brabb (1976). This is a general purpose map which has been assembled from a wide variety of both published and unpublished geologic reports and maps. It has been photographically enlarged from its published scale of 1" = 1 mile to 1" = 4,000'. As Figure 15 indicates, the proposed detention basins are located on the upper portion of the Delta Plain, between the Marsh Creek channel and the foothills of the Diablo Range.

The USGS Geologic Map indicates that the bedrock in the hills west of the sites consisted of marine sandstones and shale of Upper Cretaceous and Lower Tertiary age. These sedimentary rocks have been tilted, so they dip to the north or northeast at 10 to 40 degrees. Additionally, the bedrock is cut by generally north-trending faults, which have total displacement of up to a few thousand feet. These faults are not known to offset geologically recent deposits. Symbols on the map suggest that some traces have experienced right lateral strike-slip movement (  ). This is the type of movement that characterizes the major active faults in the San Francisco Bay Region.

The individual faults that are shown in Figure 15 are unnamed. However, this network of faults is referred to as the Vaqueros fault system. It is not considered to be active by either the U.S. Geological Survey or the California Division of Mines and Geology.

#### 2. Seismicity

Active Faults. The project area is located in the eastern portion of the seismically active San Francisco Bay Region. Figure 16 shows the location of earthquake epicenters that have been recorded by the USGS during the period 1969 to mid-1982. It also shows the location of known active faults in the Bay Region. As might be expected, there is a strong correlation between the location of earthquake epicenters and active fault zones. The earthquakes provide unequivocal evidence of stress on these faults. The nearest active faults are the Antioch and Greenville faults, which pass west and southwest of the site, respectively. Other active faults which bisect Contra Costa County include the Calaveras (16 miles southwest), the Concord-Green Valley fault, and the Hayward fault (25 miles southwest). Although no active faults cross the site, the planned improvements, like other structures in the East County, will be subject to relatively strong earthquake shaking in the event of a



- Qal Recent alluvium  
 Qaf Artificial fill  
 Qc Terrace Deposits, predominantly sand  
 Ql Clay, deposited between natural levees during storms  
 Tw Quaternary loam, deposited in the upper part of fan systems and along natural levees  
 Tn Wolfskill Formation, non-marine shale, sandstone  
 Tn Neroly Sandstone, mostly marine, contains minor shale  
 Tmk Markley Formation, undivided  
 Tnv Nortonville Shale, marine; with minor silt & sandstone  
 Td Domengine Sandstone, undivided  
 Tm Meganos Formation, undivided (Tma, -c, -d, -e)  
 Kdv Deer Valley Sandstone, marine, massive  
 Kmg Moreno Formation, undivided (Kngu, -l, -s)  
 Kj Joaquin Ridge Sandstone, marine; thin to massive (Kjs, mappable shale interbeds, > than 5' thick)  
 Km Marliff Formation, undivided (Kmm, -l, -ls, -u, -us)  
 Ku Unnamed sandstone and shale, undivided (Kus, -sh)
- Geologic contact
- Fault (solid where accurately located; dotted where concealed)
- 24 Strike and dip of bedding
- Source: Brabb (1976)

# USGS GEOLOGIC MAP

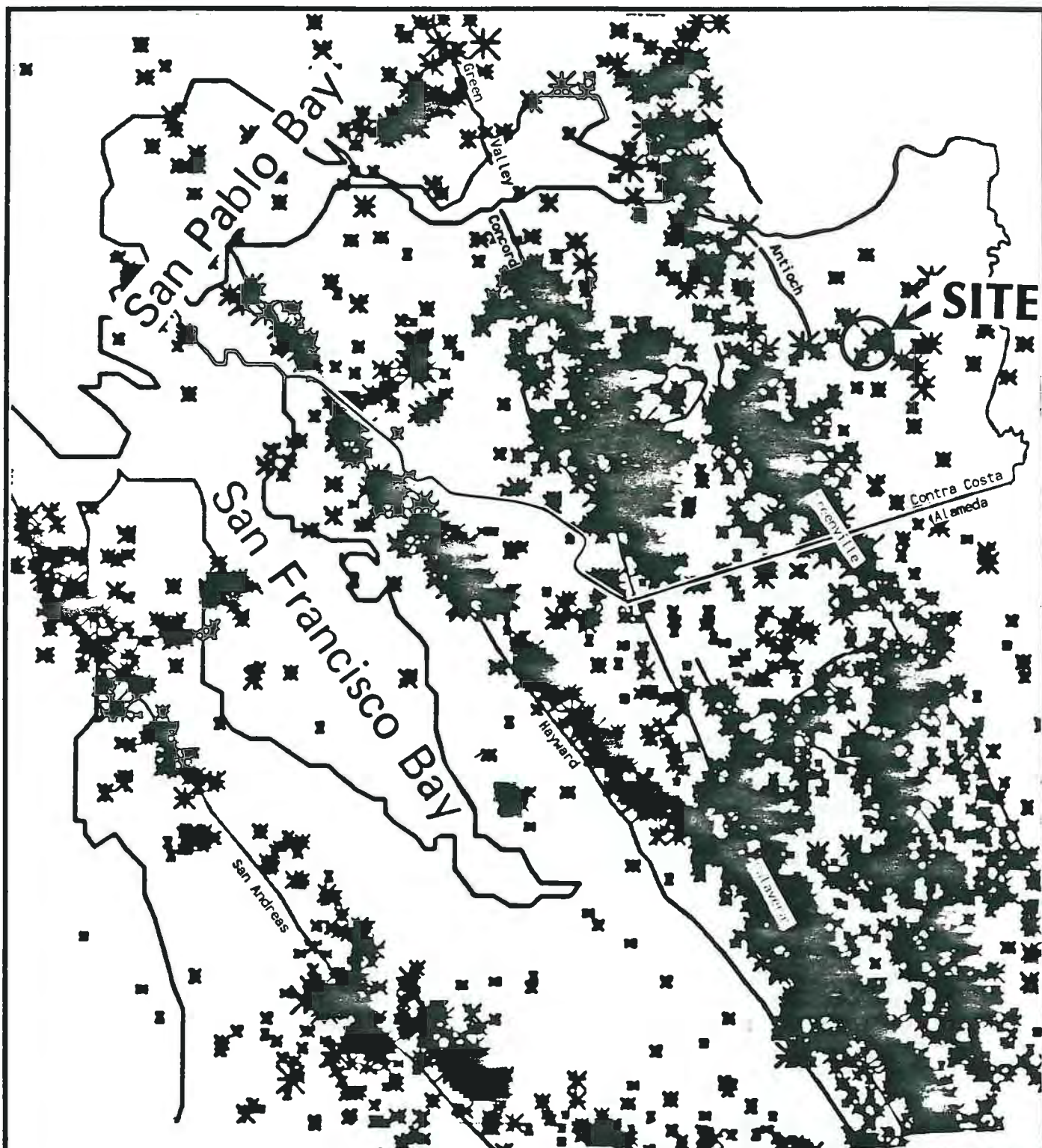
SCALE: 1" = 4000'

FIGURE: 15

DATE: 3-9-90

MARSH CREEK WATERSHED  
 REGIONAL DRAINAGE FACILITIES

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Earthquake epicenter (dark areas are high concentrations of epicenters indicating adjustments at depth along faults)

Antioch

Source: USGS CALNET catalog, reproduced from Schiener and Mills (1984)

Active fault zone

# EARTHQUAKE EPICENTER MAP 1969 - MID 1982

SCALE: 1" - 8 mi.

DATE: 3-9-90

FIGURE

16



MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

CP# 88-69

moderate to high magnitude earthquake originating in Contra Costa County or the adjacent area. Faults that warrant special mention include the Antioch, Greenville and Midland faults.

Antioch fault. The name Antioch fault is applied to a zone of active faulting identified by the USGS (Burke and Helley, 1973). The fault is not known to have moved during a historic earthquake, but the USGS has reported evidence of tectonic creep in the City of Antioch. Moreover, the Antioch area is known to be subject to relatively frequent earthquakes. For example, during the 10-year period 1962-1971, seismographs recorded nine (9) earthquakes with Richter magnitudes of 2.5 to 5.0, and more than 20 smaller earthquakes were recorded.

The CDMG has identified a Special Studies Zone along the inferred trace of this fault. According to the State Law, any subdivision of land, and most types of new construction within the SSZ, are dependent upon the favorable outcome of a geologic investigation directed to the hazard of surface fault rupture. According to their map, the fault extends south as far as Balfour Road, just east of the Deer Valley Road intersection. This places the fault approximately two (2) miles west of the proposed detention basins, and it bisects the existing Deer Creek Reservoir.

Midland Fault. It is not known to have experienced movement in Holocene time (the past 11,000 years). However, it bisects the epicentral area of the 19th and 21st of April 1892 earthquakes. Contemporary newspaper accounts suggest that these were the highest magnitude earthquakes to have originated in the Eastern Contra Costa County - Solano County area. Damage was most severe in Winters, Dixon and Vacaville, and significant damage was reported in Davis, Woodland, Antioch, Sacramento, Martinez and Napa. This seismic evidence has led some seismologists to suspect that the Midland fault may be active, and some maps show it as an active fault (Greensfelder, 1973). However, it is not considered active by either the USGS or CDMG because geologic evidence of fault rupture within the Quaternary Period (last 2 million years) is lacking. It passes approximately 3.5 miles east of Brentwood.

Greenville fault. Located at the extreme south end of the watershed, it was the source of the 24th and 26th of January 1980 earthquakes of magnitude 5.8 and 5.2, respectively. These earthquakes were accompanied by surface faulting on the segment of the fault that is immediately south of the Contra Costa-Alameda County line, and some cracks formed in pavement where the Greenville fault crosses Morgan Territory Road in Contra Costa County. Prior to this seismic event, the Greenville fault was not considered active. Subsequently, it has been classified as active by both the

U.S. Geological Survey and the California Division of Mines and Geology, and the segment of the fault that ruptured in 1980 is within a Special Studies Zone (SSZ), delineated by the State Geologist. It is mapped approximately three (3) miles southwest of the existing Marsh Creek Reservoir.

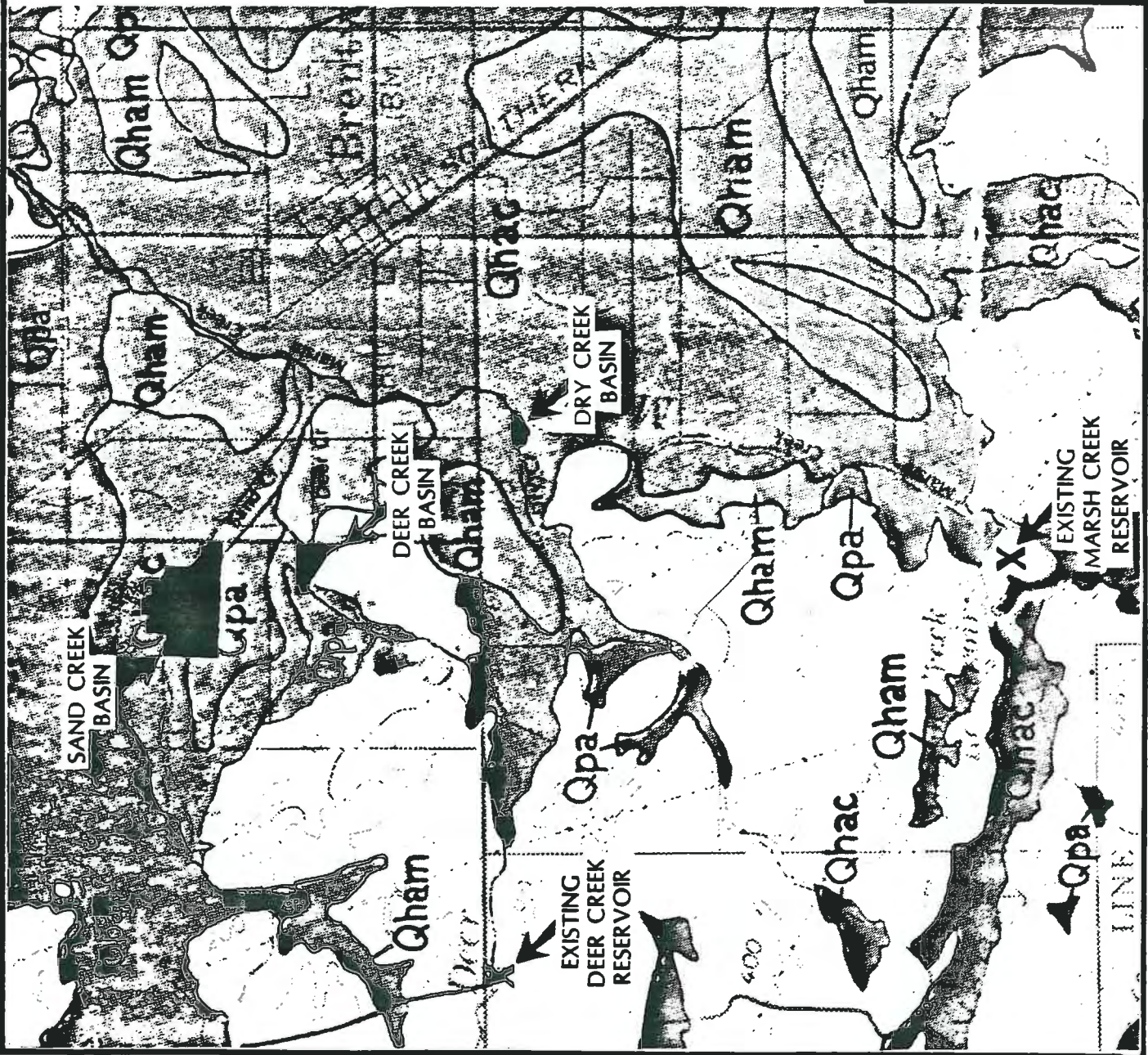
Groundshaking. Within a region of high seismicity, it can be anticipated that the planned improvements would be subject to the effects of at least one (1) high magnitude earthquake during the useful life of the proposed improvements. According to a map issued by the Association of Bay Area Governments (ABAG) (Perkins, 1983), the site would undergo weak-to-strong groundshaking (San Francisco Intensity D to E) in the event of a Richter magnitude 7.0 earthquake originating on the Concord fault. A similar magnitude earthquake on more distant faults would also produce damaging levels of groundshaking. San Francisco Intensities D and E correspond to Modified Mercalli Intensities VI to VII. Well designed structures should perform satisfactorily under these conditions.

Groundfailure. With regard to the potential for earthquake induced groundfailure in the study area, review of historic data indicates that the 1906 San Francisco earthquake produced ground cracks and differential settlement in areas of soft, water saturated ground; and landslides were created on the marginally stable or unstable slopes (Youd and Hoose, 1978). No earthquake-triggered landslides were reported in the vicinity of the sites, but the population was low and ground failure could have occurred and gone unreported.

Liquefaction is the transformation of a granular material from a solid state into a liquefied state as a consequence of increased pore-water pressure. It has produced abundant (and sometimes catastrophic) groundfailures during earthquakes, and hence must be considered in assessing seismic risks or hazards. A preliminary map of liquefaction potential of unconsolidated sediments has been made for the entire Bay Region by ABAG in cooperation with the USGS (Perkins, 1983). According to this map, the site possesses a "very low" liquefaction potential.

### 3. Soils

Surficial Deposits. The USGS Geologic Map classifies soils in project areas as Q1 (Quaternary loam) and Qc (Quaternary clay). The explanation provides a description of the depositional environment, but it does not discuss engineering limitations or agricultural capabilities of these soils. Figure 17 is a Surficial Deposits Map that provides additional information on the distribution and significance of the soils that occur in the project areas. It identifies three (3) types of alluvial deposits on the Delta Plain in the vicinity of the project sites (Qhac, Qham and Qpa).



Qhac Coarse-grained alluvium: (unconsolidated, moderately sorted, permeable sand and silt with coarse sand and gravel becoming abundant toward fan heads; represents fragmented and transported material deposited by flowing water on active stream levees and flood plains; ranges in age from historic deposits to 7,000 years old).

Qham Medium-Grained Alluvium: (unconsolidated sand, silt and clay; well bedded; stream channel and flood plain deposits; ranges in age from historic deposits to 7,000 years old).

Qpa Late Pleistocene Alluvium: (weakly consolidated, slightly weathered, poorly sorted, irregularly inter-bedded clay silt, sand and gravel; age about 10,000 years and older).

r Bedrock (includes some fill areas).

Source: Helley, et al (1979)

# USGS SURFICIAL DEPOSITS MAP

SCALE: 1" = 4000'	FIGURE: 17	N
DATE: 3-9-90		

MARSH CREEK WATERSHED  
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Qhac and Qham are geologically recent deposits that are unconsolidated. Qhac are sandy stream channel deposits; Qham are finer-grained floodplain deposits. The symbol Qpa identifies older, weakly consolidated alluvium.

Qhac and Qham have a somewhat lower capability for urban development than do Pleistocene deposits (Qpa), but each is suitable for the proposed construction.

Prime Soils. Cropped agricultural lands cover the floodplain of Marsh Creek and extend upstream to the lower foothills of the Diablo Range. Figure 18 shows the approximate distribution of prime agricultural soils. The term "prime soils" refers to farmland that is best suited for producing food, feed, forage, fiber and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban builtup land or water). It has the soil quality, growing season and moisture supply needed to produce sustained high yield of crops economically when treated and managed, including water management, according to modern farming methods.

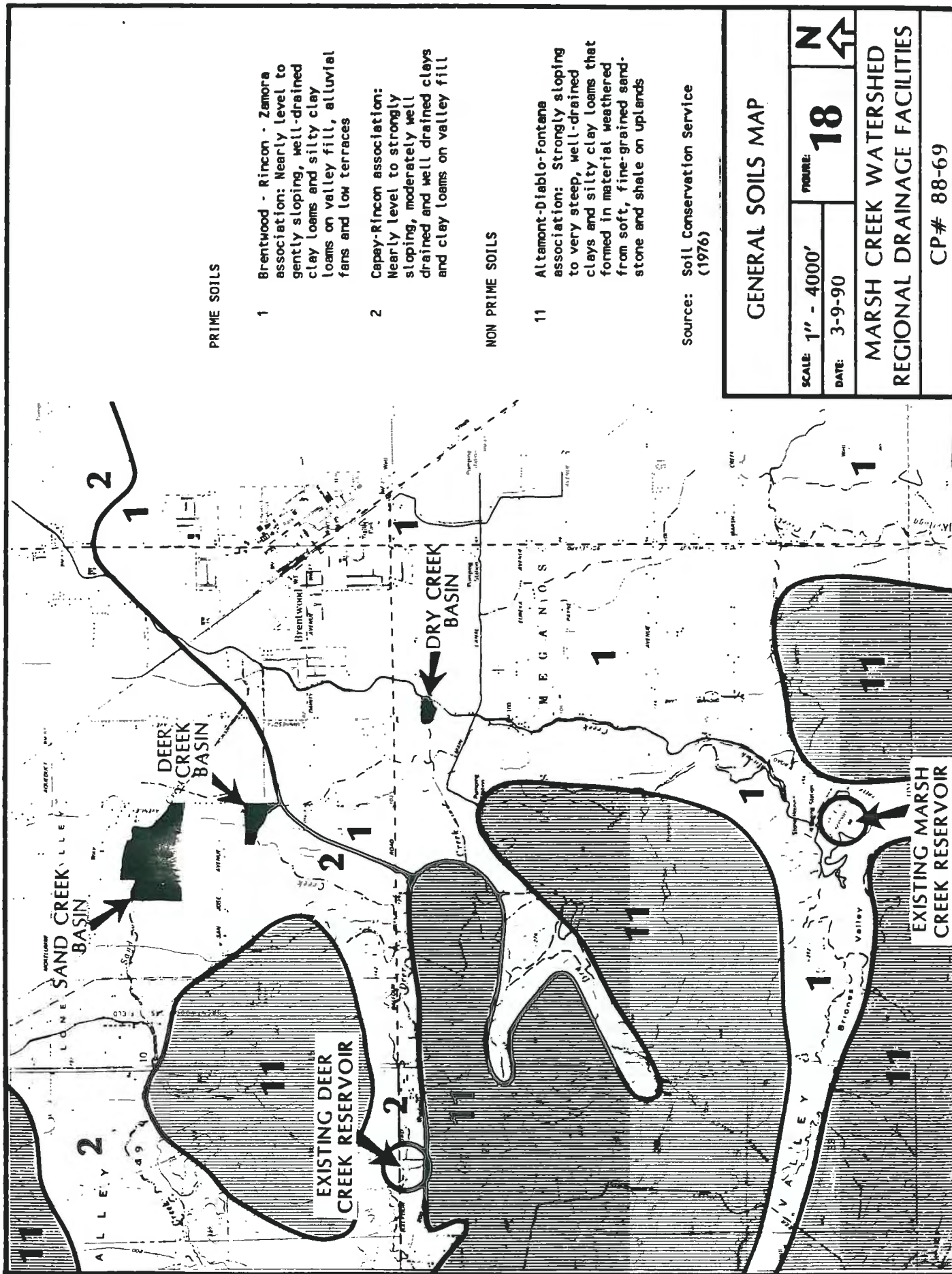
The area upstream from the floodplain is characterized by undulating topography and shallow soils which are distinguished by rapid runoff and present a high erosion hazard. Although these soils can be used for grazing and small grains, they are considered to have several limitations for commercial agricultural operations.

Figure 18 indicates that proposed basins are underlain by prime soils. Therefore, construction of the basins will result in a loss of 106.5 acres of prime soils.

#### 4. Groundwater and Economic Resources

Groundwater. The proposed projects would have a negligible effect on groundwater levels, or groundwater quality. By intent, flood control projects prevent ponding of flood waters on the floodplain. Hence, infiltration of ponded waters would be decreased. The groundwater levels on the floodplain are in large measure controlled by the elevation of the water surface in the Delta, which would remain unchanged. The flood control projects themselves would not add contaminants to groundwater, unless spraying was performed for weed abatement along their road frontages. The chemicals used would be restricted to those approved for use by the State Agricultural Commissioner.

Irrigation. Most of the agricultural products grown in the watershed are irrigated. The majority of the irrigation water for the area is supplied by the Irrigation District. Past floods have damaged or destroyed the irrigation facilities of the District, as well as many of the on-farm



# PRIME SOILS

- 1 Brentwood - Rincon - Zamora association: Nearly level to gently sloping, well-drained clay loams and silty clay loams on valley fill, alluvial fans and low terraces
- 2 Capay-Rincon association: Nearly level to strongly sloping, moderately well drained and well drained clays and clay loams on valley fill

# NON PRIME SOILS

- 11 Altamont-Diablo-Fontana association: Strongly sloping to very steep, well-drained clays and silty clay loams that formed in material weathered from soft, fine-grained sandstone and shale on uplands

Source: Soil Conservation Service (1976)

## GENERAL SOILS MAP

SCALE: 1" = 4000'

FIGURE:

18

DATE: 3-9-90



MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

CP# 88-69

irrigation systems. Since flood control improvements would benefit the irrigation facilities of the District by reducing the frequency and severity of flooding, the staffs of the districts have not expressed any opposition to the projects. Irrigation wells, which service a small part of the irrigated land in the watershed, would not be affected by any of the planned improvements.

Mineral Resources. In 1983, the California Division of Mines and Geology (CDMG) issued a report titled "Classification of Aggregate Resource Area, South San Francisco Bay Production-Consumption Region". The purpose of the CDMG study was to map significant aggregate resource areas and to present affected local jurisdictions with copies of these maps. The areas being considered for drainage improvements in the Marsh Creek watershed were not considered to have significant aggregate resources.

With regard to oil and natural gas, a variety of dry holes have been drilled in the vicinity of the site. Consequently, the potential for undiscovered reserves is low. Construction of a flood control project will not have a significant effect on petroleum resources.

## ENVIRONMENTAL ANALYSIS

### 1. Erosion and Sedimentation

Impact. The proposed project includes earthwork in the main channel of Marsh Creek, along with construction of three (3) detention basins and modifications to the existing Deer Creek Reservoir. Soil erosion from these projects could increase by as much as 200 times during the period of construction when bare soils are exposed at the surface. Based on representative soil erosion rates from construction sites, the incremental sediment load increase, expressed as total suspended solids, would be in the range of 50 to 60 milligrams/liter (mg/l). This estimated sediment load could vary considerably, depending on factors such as a) effectiveness of measures taken by the contractor to control erosion, b) the type of soil exposures (bare soils on the banks of creeks, or will annual grasses be established by onset of winter rains?), c) storm patterns (heavy storm at the beginning of the rainy season could cause severe erosion before annual grass seeds have an opportunity to germinate), d) frequency of storm events, etc. With the use of best management practices, the amount of sediment that is transported by the creek can be kept to an acceptable minimum. Following construction, within a period of two or three years, the amount of suspended sediment carried by the creek should return to the preconstruction rate. Because the detention basins will also serve as a sediment trap for sand and silt, sedimentation problems downstream from basins will be reduced below current levels.

Mitigation. During installation, state and local water pollution regulations shall be adhered to. The plans and specifications for construction activities shall include a section that will specify steps to control erosion and minimize the production of sediment and other pollutants during construction operations (all erosion and sediment control measures are to be completed before the rainy season). These steps shall include, but are not limited to the following measures:

- a) seeding to protect disturbed areas from erosion
- b) mulching to protect soil surfaces from erosion
- c) sediment basin to settle and filter out sediment to protect streams below the construction site during construction
- d) straw bale filters or silt fences to trap sediment from areas of limited runoff
- e) excavation of earth channels during the dry season
- f) adherence to regulations concerning the burning of brush or slash, or disposal of other materials
- g) use of revetment where high water velocities are anticipated, such as the outfall of pipes to prevent erosion
- h) compacting and revegetation of fill areas to avoid long-term erosion hazards
- i) by including a landscaping component, the long-term erosion effects of project implementation could be minimized.

## 2. Geologic Hazards

Impacts. The proposed basins involve significant earthwork. Although the sites are suitable for the intended use, geotechnical recommendations are needed to guide the design and supervision of the earthwork by a geotechnical engineer is needed to ensure satisfactory performance of the improvements.

Mitigation. A preliminary geotechnical investigation shall be performed for each detention basin and control structure, as well as for work in the channel. The scope of work should include exploratory boreholes, routine laboratory tests, and engineering analysis of the data gathered. The report should comment on the stability of the embankments and provide recommendations to govern grading, drainage and foundation design, including placement of fill. Additionally, the excavations for modification of the existing Deer Creek Reservoir should be inspected by an engineering geologist. The purpose of the field observations would be to prepare an "as built" geologic map that shows the accurate location of any faults that are uncovered; and based on the data, provide supplemental recommendations, should they be warranted. If copies of the geologist's

field reports and maps were submitted to the Community Development Department, the work would also add to the County's knowledge of the Antioch fault system.

### 3. Seismicity

Impact. Groundshaking is the oscillation or vibration of earth materials resulting from an earthquake. The level of groundshaking is a combination of a large number of factors, including a) Richter magnitude of the earthquake, b) distance from the causative fault, c) earthquake focal depth, d) source mechanism, e) travel-path geology, and f) local site conditions.

The effect of groundshaking on the drainage improvements depend on the design of the improvements and the quality of workmanship and materials used during construction. It is difficult to predict accurately the level of groundshaking at a given site, and therefore to evaluate the effect of such shaking on specific improvements.

Mitigation. To a considerable extent, the risk of earthquake damage must be regarded as an unavoidable adverse impact. Nevertheless, a conservative design for embankments and other improvements can keep earthquake damage to a practical minimum. The preliminary geotechnical report could provide an evaluation/professional opinion on the performance of improvements under earthquake conditions. If this were done, the seismic risks could be minimized.

### 4. Prime Agricultural Land

Impact. An impact of the project will be the loss of approximately 108 acres of prime soil within the three proposed detention basin sites, along with another 18 acres for expansion of the existing Deer Creek Reservoir. Commercial agricultural uses within the detention basin sites will be precluded. The properties that would be affected are shown in Figures 2, 4 and 8. This impact is partially offset by the reduction in downstream flood damage on approximately 1500 acres of prime and non-prime agricultural land.

Specific comments on the basins are as follows:

- a) Dry Creek Basin is a 4-acre site on lands dedicated to the City of Brentwood for a park. It is surrounded by a residential development project. Due to its small size and the nature of surrounding uses, a commercial agricultural use is infeasible. The only alternative use of the site is as a city park.

- b) Deer Creek Basin is located immediately downstream from an existing drop structure. This location provides the needed volume while keeping the surface area of the site to a minimum. It is located on the west side of the corporate limits of Brentwood. Lands across Fairview Avenue from the site are designated for low density residential development and business park. The Deer Creek Basin site is a buffer on the fringe of urban development. Approximately 2 acres of the site are creek channel and eroding banks that have no potential for commercial agricultural crops.
- c) Sand Dreek Basin is located in an area where there are drop structures, allowing the surface area of the basin to be kept to a minimum and still have sufficient volume to serve its flood control function. Like the proposed Deer Creek Basin, it is on the fringe of areas designated for residential development in Brentwood; approximately 10 acres of the basin is existing creek channel and eroding banks that are unsuitable for commercial agriculture, and the site is just east of residential development in southeast Antioch. The City has recently modified its general plan and is extending south across the Lone Tree Valley and into the foothills to the south. These relatively recent changes are not reflected in Figure 11. There are development pressures east and west of the site. If the regional basin on Sand Creek were not constructed, developers in this watershed would be required to find other means of mitigating drainage impacts, such as building privately maintained basins within individual projects. Development pressure on the site itself is high at present. If it is not acquired for use as a detention basin, it is likely to be used for urban development.

Mitigation. To a considerable extent, loss of prime soils is an unavoidable adverse impact. Conceivably, a portion of the Sand Creek basin could continue to be used for commercial agriculture after construction of the project. Potential uses include row crops or grains. If land in the basin is not leased for commercial agriculture, it will provide a good openland habitat for wildlife.

## D. BIOTIC RESOURCES

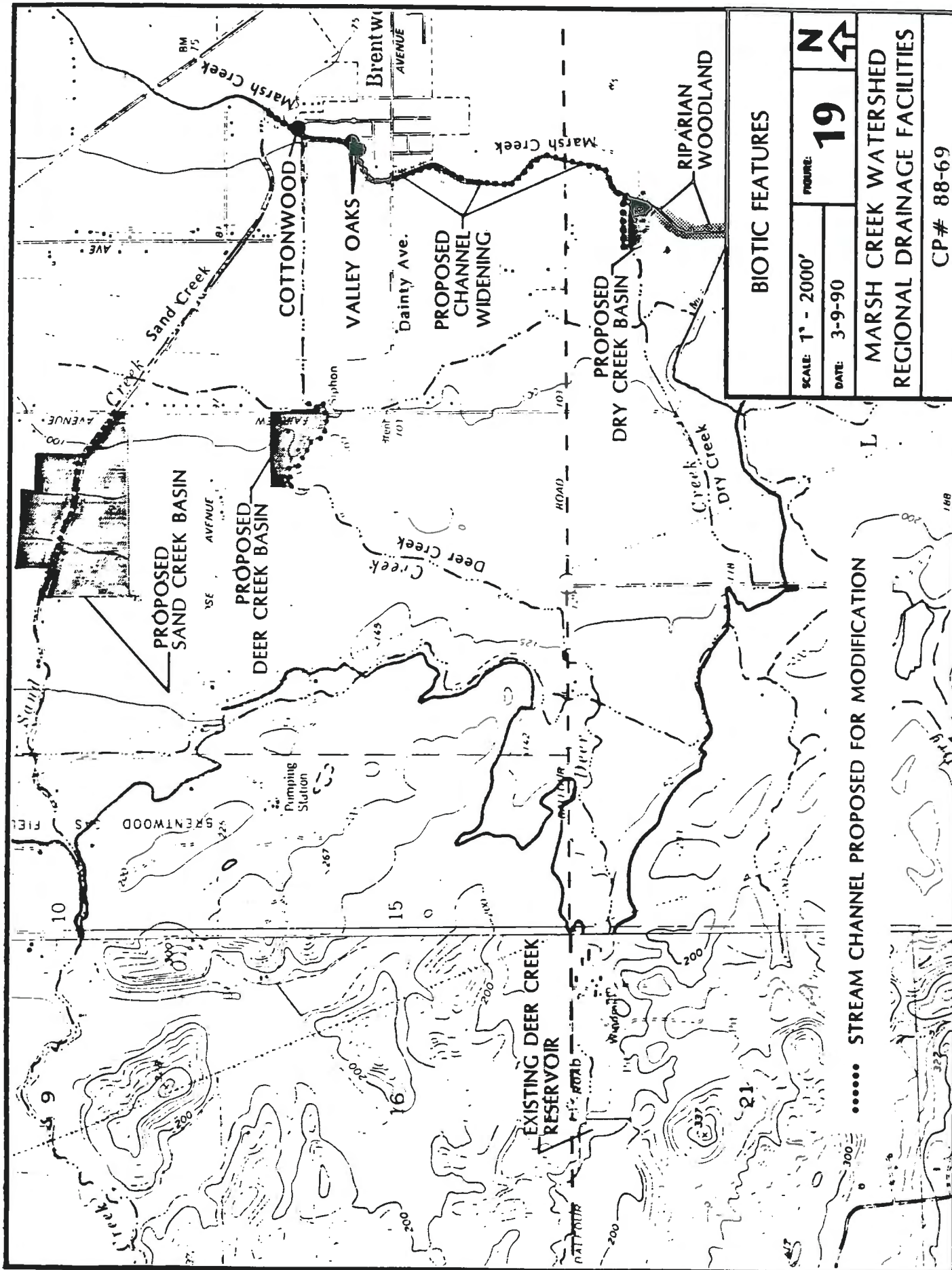
### SETTING

#### 1. Vegetation

Existing vegetation in the vicinity of proposed drainage facility improvements is composed primarily of introduced annual grasses and forbs, agricultural fields, and ornamentals. Exceptions to this consist of: three large trees along Marsh Creek in the vicinity of the Dainty Road crossing; a well-developed riparian woodland along Marsh Creek to the south of its confluence with Dry Creek; and less well-developed riparian vegetation along other segments of the perennial streams proposed for improvements. Figure 19 indicates the location of specimen-sized trees, with breast high diameters greater than 32 inches. Figure 19 also shows the extent of well-developed riparian vegetation along Marsh Creek, and the locations of stream channels proposed for modifications.

Riparian vegetation occurs along the Marsh Creek, Deer Creek, and Sand Creek corridors, varying from well-developed woodland, to only an occasional sedge or rush with a cover of primarily introduced annual grasses and forbs. Previous flood control modifications to all of the stream channels appear to have severely altered the extent of well-developed riparian vegetation. The last remaining corridor of mature riparian woodland occurs along Marsh Creek, south of the confluence with Dry Creek. Vegetation along this reach of channel is composed of valley oak (Quercus lobata), live oak (Quercus agrifolia), sycamore (Plantus racemosa), Fremont cottonwood (Populus Fremontii), Arroyo willow (Salix lasiolepis), rose (Rosa californica), California blackberry (Rubus vitifolius), poison oak (Toxicodendron diversilobum), and elderberry (Sambucus caerulea). Vegetation along the remaining segments is less well-developed, varying from intermittent stands of narrow-leaved cat-tail (Typha latifolia), bullrush (Scirpus sp.), and willow, to sparse occurrences of sedge (Carex sp.) and rush (Juncus sp.), with a dominant cover of introduced annual grasses and weedy vegetation. As indicated in Figure 19, three large trees occur along the Marsh Creek corridor adjacent to the existing manmade channel. They may be remnants of the woodland that existed along this segment of the creek prior to construction of channel improvements by the Soil Conservation Service. The trees consist of two valley oaks and one Fremont cottonwood, all with trunk diameters exceeding 32 inches.

Annual grassland, agricultural and ornamental vegetation form the predominant plant cover over most of the areas proposed for improvements. Plant species in the grassland are generally introduced annuals, such as slender wild oat



(Avena barbata), ripgut grass (Bromus diandrus), soft chess (Bromus mollis), and foxtail barley (Hordeum leporinum). Several species of introduced annual forbs are also abundant in the grassland, including: mouse eared chickweed (Cerastium viscosum), field mustard (Brassica campestris), red-stemmed filaree (Erodium cicutarium), common chickweed (Stellaria media), and bur-clover (Medicago polymorpha). Areas where introduced annual grassland forms the predominant vegetative cover include: the site of the Dry Creek detention basin and the west side of the Marsh Creek corridor between Dry Creek and Balfour Road; the expansion area of the existing Deer Creek Reservoir; and along most of the other immediate portions of Marsh Creek proposed for widening.

Agricultural vegetation in the vicinity of proposed improvements consists of both orchard and field crops. These include: an actively producing cherry orchard along the east side of Marsh Creek to the south of Balfour Road; senecent almond and walnut orchards along the Marsh Creek corridor between Dainty Road and Balfour Road; a fig orchard in the vicinity of the proposed Deer Creek basin; and field crops such as tomatoes and beans over most of the area encompassed by the proposed Sand Creek basin.

In addition, ornamental vegetation has been planted as landscaping around residences in the vicinity of proposed improvements. This includes one residence within the limits of the proposed Sand Creek basin, one residence and out-buildings within the limits of the proposed Deer Creek basin, and intermittently along portions of the Marsh Creek corridor between Dainty Road and the confluence with Sand Creek. The landscaping is composed of non-native species of trees, shrubs and groundcovers.

## 2. Wildlife

Wildlife species which occur on or frequent the project vicinity are generally associated with grassland, agricultural, and suburban habitat. Areas of sparse grassland and agricultural vegetation provide only poor to marginal habitat for wildlife due to the absence of adequate cover. Wildlife species which may occur in areas with established cover, or frequent the vicinity of proposed improvements include: meadowlark (Sturnella neglecta), ring-necked pheasant (Phasianus colchicus), white-crowned sparrow (Zonotrichia leucophrys), California vole (Microtus californicus), gopher snake (Pituophis melanoleucus), and western fence lizard (Scheloporus occidentalis). Several species of raptors may forage in the grassland, agricultural and open riparian habitat, such as red-tailed hawk (Buteo jamaicensis), American kestrel (Falco sparverius), and turkey vulture (Cathartes aura).

Riparian corridors are generally important features to wildlife, providing a source of drinking water and protective cover, and serving as movement corridors. However, the extent of previous modifications to the stream channels in the project vicinity generally limits their wildlife habitat value. Areas of dense riparian vegetation along small segments of Marsh Creek, Deer Creek and Sand Creek continue to provide important riparian habitat to wildlife, particularly the well-developed woodland along Marsh Creek to the south of Dry Creek. Trees in the riparian woodland along Marsh Creek, and at other locations, provide important perching, roosting and nesting locations for bird species.

### 3. Special-Status Species

A record search conducted by the California Natural Diversity Data Base (1989) together with other relevant information (California Native Plant Society, 1988; Munz, 1975; and various environmental documents), indicates that historical occurrences of several plant and animal taxa with special status have been recorded from eastern Contra Costa County. Special-status taxa include: officially designated (rare, threatened, or endangered) and candidate species for listing by the California Department of Fish and Game (CDFG); officially designated (threatened or endangered) and candidate species for listing by U.S. Fish and Wildlife Service (USFWS); and other species considered to be rare or endangered under the conditions of Section 15380 of the California Environmental Quality Act (CEQA) Guidelines (State of California, 1986), such as those identified in the Inventory of Rare and Endangered Vascular Plants of California (CNPS, 1988).

Several animal taxa recognized as "special animals" by CNDDB have been recorded from eastern Contra Costa County and the Brentwood area. "Special animals" is a broad term referring to those animal species with legal status, or considered significant because of restricted distribution, declining habitat and other factors. Animal taxa which were considered to possibly occur in the project vicinity include: San Joaquin kit fox (Vulpes macrotis mutica), California tiger salamander (Ambystoma tigrinum Californiense), California red-legged frog (Rana aurora draytoni), and molestan blister beetle (Lytta molesta).

San Joaquin Kit Fox. Eastern Contra Costa County represents the northernmost extent of the known range of the San Joaquin kit fox. This subspecies, federally listed as endangered and state listed as threatened, has declined substantially throughout its range due to habitat loss (O'Farrell, 1983). Historically, the preferred habitat of this subspecies was alkali scrub, which has been largely replaced by agricultural development. Currently, kit fox occur in the remaining alkali scrub and grassland habitat,

with sporadic occurrences in savanna and woodland habitats. Until recently sited near Byron Hot Springs, approximately five miles to the south of the project vicinity, investigations into the status and biology of kit fox in the northern portion of its range indicated that the local population may be susceptible to extirpation (Hall, 1983). Historic occurrence records for the subspecies indicate kit fox sightings near Byron Hot Springs and the sandpits near the intersection of Camino Diablo and Vasco Road. The occurrence of occasional dispersal of kit fox in the project vicinity is highly unlikely due to extent of suburban and agricultural development in the area.

California Tiger Salamander. California tiger salamander is a candidate taxa for federal listing. The distribution of this subspecies has declined due to conversion of valley and foothill grassland habitats to agricultural and urban uses (Stebbins, 1985). The subspecies has been observed along Marsh Creek Road in the vicinity of Marsh Creek Reservoir (CNDDB, 1989), and most likely migrates to the reservoir in winter to breed. Very little is known about the life history of this subspecies. Adults tend to occupy burrows of ground squirrels and other rodents for much of the year, and migrate to nearby sources of water to breed following the first hard rains in fall. Undisturbed segments of Marsh Creek may support tiger salamander populations, but it is unlikely that the subspecies occurs in areas proposed for improvements due to extent of previous channel modifications and the absence of slow moving, ponded water along the streams.

California Red-legged Frog. The California red-legged frog is a candidate taxa for federal listing and is designated a "protected amphibian" under Title 14, Chapter 5, Section 40.00 of the CDFG Code. Except under special permit from CDFG, the subspecies may not be taken or possessed at any time. This subspecies is apparently declining in California due to habitat destruction, competition and predation by the introduced bullfrog (Moyle, 1973). As with the tiger salamander, the occurrence of populations of red-legged frog along portions of the stream proposed for improvements is unlikely due to the extent of previous channel modifications and the absence of ponded water.

Molestan Blister Beetle. The molestan blister beetle is a candidate taxa for federal listing. Very little is known about the life history and habitat requirements of this particular species of insect, which belong to the Meloidae family (Pinto, personal communication). Occurrence records indicate that adult beetles tend to be active from February to April, and members of the Meloid family have been observed throughout September (Singleton, personal communication). The larvae are voracious predators, and the adults feed on pollen, aggregating on flowers. The species have

been recorded from the Marsh Creek watershed, approximately 1 mile west of the reservoir, and immediately northwest of the City of Brentwood (CNDDDB, 1989).

Based on recorded geographic range and suitable habitat, nine plant taxa with special status were considered as potentially occurring in the vicinity of proposed improvements. These taxa include large-flowered fiddleneck (Amsinckia grandiflora), Hoover cryptantha (Cryptantha hooveri), diamond-petaled California poppy (Eschscholzia rhombipetala), stink bells (Fritillaria agrestis), great valley gumweed (Grindelia camporum var. parviflora), diablo rock-rose (Helianthella castanea), Brewer dwarf flax (Hesperolinon breweri), Contra Costa goldfields (Lasthenia cojugens), and caper-fruited tropidocarpum (Tropidocarpum capparideum).

Information on these taxa, including name, status, suitable habitat, distribution and flowering period is indicated in Table VI.

Field surveys of the project vicinity were conducted on 14 April, 25 May, 7 July and 12 October 1989 to determine whether plant and animal taxa of concern occur in the area. Potential habitat areas were surveyed for sensitive plant and animal populations. Although suitable habitat for several taxa of concern was observed within the study area, no special-status taxa were encountered during the surveys.

#### 4. Wetlands

Although definitions vary to some degree, wetlands are generally considered to be areas that are periodically or permanently inundated by surface or ground water, and support vegetation adapted for life in saturated soil. The California Department of Fish and Game (CDFG) and U.S. Army Corps of Engineers (Corps) have jurisdiction over modifications to stream channels and other wetlands features. Section 1601 of the State Fish and Game Code stipulates that it is "unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake" without notifying the department, incorporating necessary mitigation, and obtaining a Stream Bed Alteration agreement with the Department. The Wetlands Resources Policy of the CDFG states that the Fish and Game Commission will "strongly discourage development in or conversion of wetlands.... unless, at a minimum, project mitigation assures there will be no net loss of either wetland habitat values or acreage". Jurisdiction of the Corps is established through the provisions of Section 404 of the Clean Water Act, which prohibits the discharge of dredged or fill material into waters in the United States without a permit (individual or nationwide permit) from the Corps.

**TABLE VI**  
**SPECIAL-STATUS PLANT TAXA**  
**POTENTIAL OCCURRENCE-MARSH CREEK VICINITY**

TAXA NAME	STATUS (Fed/State/CNPS)	HABITAT CHARACTERISTICS (Munz & Keck 1973; CNDDB, 1989)	DISTRIBUTION (Munz & Keck 1973; CNPS 1988) (Presumed Extirpated)	FLOWERING PERIOD (Munz & Keck 1973)
<u>Amsinkia grandiflora</u> Large-flowered fiddleneck	E/E/1B	Open grassy slopes below 1,200 feet	Alameda, San Joaquin, (Contra Costa)	April-June
<u>Cryptantha hooveri</u> Hoover cryptantha	-/-/4	Bedrock outcrops, dry rocky areas	Alameda, Contra Costa, Madera, Merced San Joaquin, Stanislaus	April-May
<u>Eschscholzia rhombipetala</u> Diamond-petaled California poppy	C2/-/1B	Open dry areas in grassland or rocky areas	Contra Costa, San Joaquin, San Luis Obispo, (Alameda, Colusa, Stanislaus)	March-April
<u>Fritillaria agrestis</u> Stinkbells	C2/-/4	Heavy clay soils in low-lying areas	Alameda, Contra Costa, Kern, Mendocino, Monterey, San Benito, San Luis Obispo, Stanislaus	March-April
<u>Grindelia camporum</u> var. <u>parviflora</u> Great valley gumweed	-/-/4	Dry grassy slopes	Alameda, Contra Costa, Marin, Riverside, San Benito, San Francisco, San Mateo	May-October
<u>Helianthella castanea</u> Diablo rock-rose	C2/-/1B	Grassy slopes in oak woodland, savanna, and chaparral openings	Alameda, Contra Costa, San Mateo (San Francisco)	April-May
<u>Hesperolinon breweri</u> Brewer dwarf flax	C2/-/1B	Grassy slopes and rock outcrops in woodland and chaparral, commonly on serpentine below 3,300 feet	Contra Costa, Napa, Solano	May-June
<u>Lasthenia conjugens</u> Contra Costa goldfield	C2/-/1B	Low flats and borders of vernal pools	Napa, Solano, (Alameda, Contra Costa, Mendocino, Santa Barbara, Santa Clara)	April-May
<u>Tropidocarpum capparideum</u> Caper-fruited tropidocarpum	C2/-/1B	Grassy alkaline slopes below 500 feet	(Alameda, Contra Costa, Glenn, Monterey, San Joaquin, Santa Clara)	March-April

**STATUS DESIGNATIONS:**

Federal (USFWS, 1989 and 1989a):

E = Listed as "endangered" under the federal Endangered Species Act.

C2 = A "candidate" species under review for federal listing. Includes taxa for which the USFWS currently has some information indicating that "proposing to list them as endangered or threatened species is possibly appropriate", but for which further biological research and field study is usually needed to determine biological vulnerability and threats.

State (CDFG, 1988, 1988a, and 1989):

E = An "endangered" species. Serious danger of becoming extinct throughout all or significant portion of range due to varying factors (Section 2062 of Fish and Game Code).

CNPS (CNPS, 1984):

1B = Plants of highest priority; plants rare and endangered in California and elsewhere.

4 = Plants of limited distribution.

Marsh, Sand, Deer and Dry Creeks all have well defined stream channels in the vicinity of proposed creek widening and detention basin improvements, and any modifications to these features would most likely be subject to jurisdictional review and approval by both the CDFG and the Corps. The proposed expansion area of the Deer Creek reservoir does not encompass a well defined channel or other wetland feature, and most likely would not be subject to the wetland policies of either agency.

## ENVIRONMENTAL ANALYSIS

### 1. Vegetation

Impact. In general, existing vegetation encompassed by proposed channel modifications and detention basins would be removed to accommodate the flood control improvements. This would include limited corridors of riparian vegetation along Marsh, Sand and Deer Creeks, areas of introduced annual grassland, agricultural fields and orchard, and ornamental landscaping in the vicinity of residences to be moved or demolished. Depending on the final improvement plans, the three large trees located near the Dainty Road crossing may be removed or damaged by construction activities. The well-developed riparian woodland along Marsh Creek to the south of the confluence with Dry Creek would not be affected by proposed improvements. Table VII indicates the extent of vegetation removal in the vicinity of proposed drainage improvements.

As currently planned, landscaping would be provided intermittently around the perimeter of the proposed detention basins, as well as along the 7000-foot reach of Marsh Creek channel between Dry and Sand Creeks. Although detailed plans have not been prepared and information on plant species to be used in the landscaping effort is not available, a conceptual plan for the Dry Creek Basin shows the potential for landscape treatment to enhance aesthetic and wildlife habitat value of project areas (see Figure 20).

Representatives of the Flood Control District have indicated that landscaping associated with the proposed improvements would be similar to those detailed in a Master Landscape Plan prepared for detention basins in the Oakley area (SDC/ Site Development Consultants, 1989). The Master Landscape Plan referred to by District representatives was proposed specifically for five (5) existing detention basins in the Oakley area, addressing the environmental and soils conditions at each basin, and providing landscape standards, planting details, irrigation details, and standard maintenance specifications.



TABLE VII  
EXISTING VEGETATION REMOVAL

<u>DRAINAGE FEATURE</u>	<u>EXTENT OF VEGETATION TO BE REMOVED<sup>7</sup></u>
Sand Creek Basin	<p>Approximately 90 acres of agricultural land (primarily row crops) and ornamental vegetation.</p> <p>Approximately 3,200 linear feet of sparse riparian vegetation.</p>
Deer Creek Basin	<p>Approximately 16 acres of orchard and ornamental vegetation.</p> <p>Approximately 1,800 linear feet of cattail dessicated riparian vegetation.</p>
Dry Creek Basin	<p>Approximately 4 acres of introduced grassland and fallow agricultural land.</p>
Deer Creek Basin	<p>Approximately 18 acres of introduced grassland.</p>
Marsh Creek Channel	<p>Approximately 7,000 linear feet of sparse riparian vegetation.</p> <p>Possibly two (2) mature valley oak and one (1) native cottonwood tree.</p> <p>Adjacent grassland, senescent orchard and ornamental vegetation.</p>

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Assumes that entire acquisition would be impacted, and existing vegetation would be removed during construction.

This landscape plan provides a detailed list of both native and non-native plant species which may be suitable for consideration in developing landscape plans for the Marsh Creek area, but does not provide specific information on improvements appropriate for the proposed project. In addition, one of the reoccurring solutions provided in the SCS Landscape Plan to control growth of "weedy" vegetation and mosquito infestations is the use of a bypass piping system. Such a system would divert all low water flows across the basin and effectively eliminate the associated riparian vegetation. Because a bypass system would prevent the reestablishment of existing riparian corridors modified by the project, it would probably be opposed by the CDFG and the Corps of Engineers.

Mitigation. Significant vegetation along the banks of Marsh Creek should be retained. This should include the riparian woodland upgradient from the confluence with Dry Creek, the two valley oak located approximately 75 feet southeast of the Dainty Road crossing, and, if feasible, the large cottonwood located approximately 50 feet northeast of the confluence with Deer Creek. Grading should be avoided within the drip line of individual trees to be retained. The limits of proposed grading should be clearly flagged in the field prior to, and through completion of construction activities in the vicinity of the significant vegetation. Construction of a temporary wire fence around the area where grading is not allowed, along with appropriate signing, is recommended prior to commencement of grading.

A qualified plant ecologist or landscape architect familiar with the planting and maintenance requirements of native plant species should be retained to prepare a mitigation plan which addresses the loss of wetland habitat, and provides for the replacement and enhancement of existing wetland features. As part of the mitigation plan, landscaping with native plant species shall be emphasized to replace corridors of riparian vegetation modified or eliminated by proposed improvements, and to enhance the wildlife habitat value of the features. At minimum, the plan should: a) incorporate a low-flow channel into the Sand Creek and Deer Creek detention basins to permit the reestablishment of riparian vegetation such as narrow-leaved cat-tail, bullrush and arroyo willow; and b) include intermittent plantings of native tree and shrub species along the 7000 foot reach of Marsh Creek that is proposed for modification, and c) include intermittent plantings of native tree and shrub species around the fringes of all proposed detention basins. Suitable species for use in the intermittent plantings include: valley oak, live oak, California buckeye, Fremont cottonwood, and sycamore. The cost of revegetation should be budgeted for and included in the contract specifications. The scope of the revegetation effort will reflect concerns and participation by the City of Brentwood. However, as a minimum, existing vegetation should be replaced at a ratio of 3:1.

## 2. Wildlife

Impact. Removal of the existing vegetation in the vicinity of proposed improvements would also eliminate the existing wildlife habitat in these areas, and wildlife would be displaced to surrounding areas during construction periods. It is highly likely that the common wildlife species would continue to frequent areas proposed for flood control improvements following project implementation. The detention basins would eventually provide habitat for wildlife which would not be disrupted by agricultural activities or possibly replaced by suburban development, as is occurring on many of the surrounding parcels.

Mitigation. See mitigation for item #1 above. Reestablishment of riparian vegetation and intermittent landscaping with native species would serve to replace wildlife movement corridors and possibly enhance existing wildlife habitat.

## 3. Special-Status Taxa

Impact. No special-status taxa were encountered during the field surveys of the project vicinity, and no significant adverse impacts on identified taxa are anticipated. Based on the reported occurrence in the Brentwood area, it is possible that the Molestan blister beetle may occasionally disperse throughout the project vicinity, but congregations or individuals were not encountered during the field surveys, and any potential impacts on this taxa would not be considered significant because no congregations of beetles were observed on-site.

Mitigation. None required.

## 4. Wetlands

Impact. As currently proposed, modifications would be made to the Marsh, Sand, and Deer Creek channels, all of which would be subject to review and approval by the CDFG, and possibly the Corps of Engineers. Marsh Creek would be widened from its confluence with Dry Creek to the confluence with Sand Creek, a distance of approximately 7,000 linear feet. Stream channels and associated riparian vegetation along Sand Creek (approximately 3,200 linear feet) and Deer Creek (approximately 1,800 linear feet) would be replaced with the proposed detention basins on these streams. Although no riparian vegetation occurs along Dry Creek, approximately 750 linear feet of the channel would also be replaced by a proposed detention basin.

Mitigation. A low flow channel should be provided in the Dry Creek Basin, so there would be no net loss of channel length. The revegetation plans shall ensure that there will

be no net loss in wetland quality or quantity. The revegetation plans for the proposed flood control improvements should be coordinated with representatives of the CDFG and Corps to ensure that the concerns and possible requirements of both agencies can be easily incorporated into the final design. Jurisdictional determinations and appropriate mitigation will be required subject to the provisions of Section 404 of the Clean Water Act and Section 1601 of the CDFG Code.

## E. TRAFFIC AND CIRCULATION

### SETTING

#### 1. Project Area Circulation

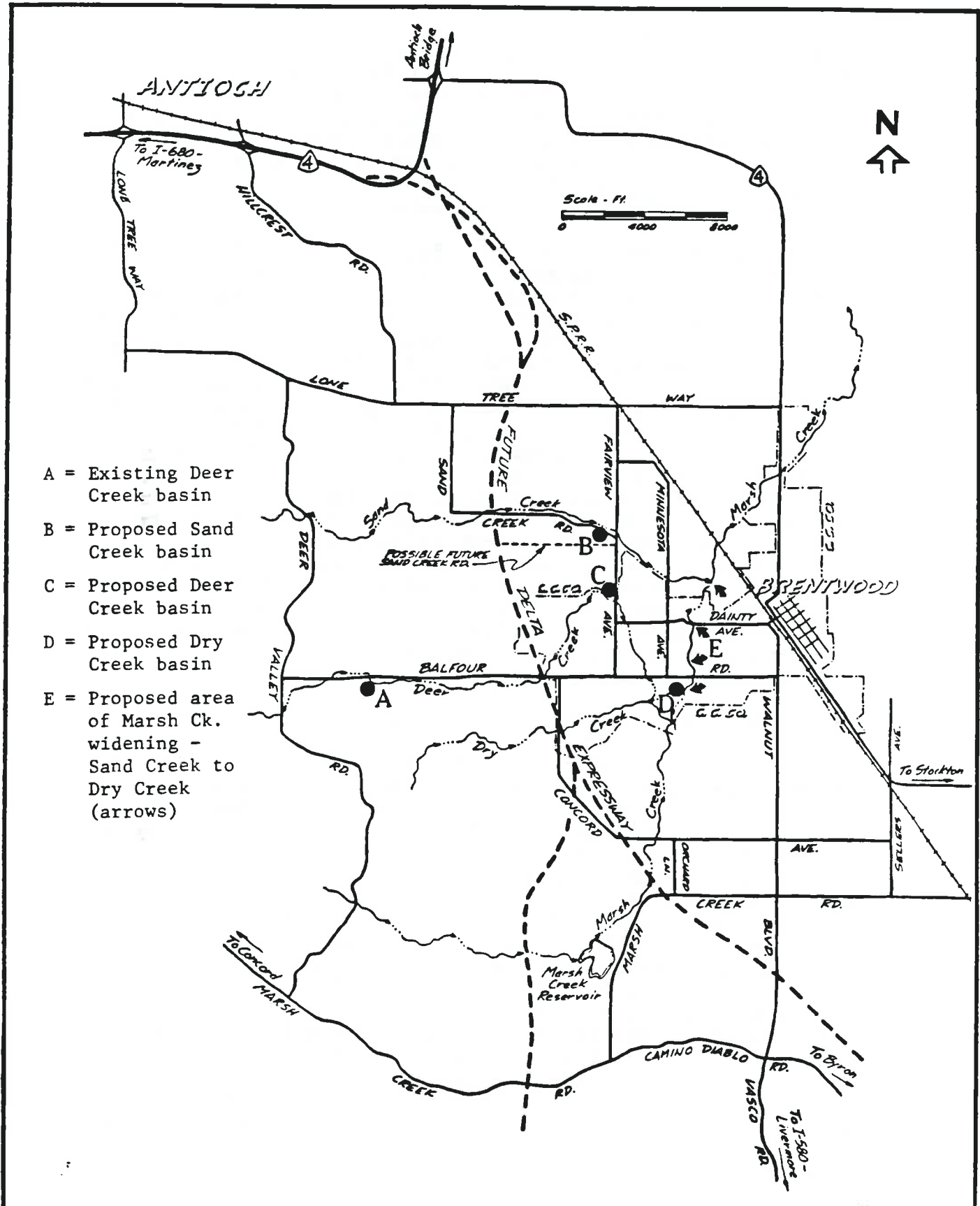
The primary roadways serving the area of the proposed projects, and the approximate alignment of the proposed Delta Expressway, are shown on Figure 21. The overall circulation system of the East County area, south of Highway 4, consists primarily of two-lane rural roads with limited shoulders and stopsign intersection control. Many of these roadways are being improved in conjunction with rapidly occurring development in the southeast portion of Antioch (Lone Tree Way/Hillcrest Road area), and along the Fairview Avenue corridor of Brentwood. In the future, the principal circulation route in the area will be the Delta Expressway, a two-lane roadway which will allow increasingly heavy East County through traffic to bypass core areas of Brentwood and Oakley. This route will carry through traffic traveling between Antioch and Stockton. It will improve access to developing residential areas west of Brentwood and reduce congestion along Highway 4 in the Oakley-Brentwood area.

In conjunction with new roadway construction south of Brentwood, a new north-south arterial roadway will be established between Highways 4 and 580. This road will replace Vasco Road and will be constructed in conjunction with the building of Las Vaqueros Reservoir.

Of the five proposed flood control improvements, only the Sand Creek detention basin, at Sand Creek Road and Fairview Avenue, would require any alteration of existing or planned circulation routes. The Sand Creek basin, the largest of the proposed facilities, is bisected by a segment of Sand Creek Road. The Flood Control District proposes to realign Sand Creek Road. The proposed roadway realignment is shown in Figure 21. As planned, Sand Creek Road would be constructed as a straight line, east-west connection between Fairview Avenue and the future Delta Expressway. The proposed Sand Creek detention basin provides sufficient width along its south boundary to accommodate the Sand Creek Road right-of-way.

#### 2. Project Traffic

Development of the proposed flood control facilities will primarily involve excavation of earth and construction or improvement of earthen levees. All of the excavated material will either be used in the construction of levees, or will be placed as fill on the project sites, either within the existing boundaries of the sites or within adjacent



PROJECT AREA  
CIRCULATION

FIGURE:

21

MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

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areas which are proposed to be acquired as additional right-of-way. Thus, no traffic will be generated for the purpose of transporting excavated material from the sites. Truck traffic associated with development of the drainage facilities will be limited chiefly to the transportation of equipment and materials needed to construct concrete structures (spillways, junction structures and weirs, along with fencing, culverts, reinforcing steel, aggregate, rip rap, and various prefabricated materials).

In lieu of payment of drainage fees, it is anticipated that developers of subdivisions in the areas of the proposed projects will have the option of performing earthwork on a basin site or installing other improvements needed for the construction of the particular detention basin. This option would allow developers to "work off" their flood control fees using crews and earthworking equipment already on-site for subdivision improvements, thereby reducing mobilization costs. It also avoids/minimizes the need for truck transportation trips to haul earthworking equipment to and from the East County area for work on the detention basin sites. This method of providing in-kind payment of fees has already been arranged with regard to the proposed Dry Creek basin and for a portion of the Marsh Creek widening. The Dry Creek basin is located within the boundaries of Subdivision 6492, and the developer has agreed to perform the excavation during the calendar year 1990, in conjunction with subdivision development. Thereafter, as funding is available, the Flood Control District will contract for completion of detention basin improvements.

It is not possible to predict precisely the level of traffic which would be generated by the proposed projects. Rough projections of traffic can be made, relying on estimates of required construction materials contained in the Flood Control District's Engineers Report (dated January 1990), along with analysis of construction material capacities of trucks. A 1985 EIR on flood control improvements to San Ramon Creek, Chaney Road to Livorna Road (County File # PW85-55) provided estimates of truck capacities for each type of earth moving equipment needed for the proposed projects. Based on this data, it is estimated that each project will require approximately 100 to 200 round trips by truck. Depending on the locations of sources of materials (ready-mix concrete, reinforcing steel, pipe, aggregate, asphalt, etc.) the truck trips would be divided between access routes from the north (Highway 4 corridor and beyond) and from the south (Vasco Road from I-580 and beyond). It is anticipated that most trips would be from the north because of the availability of sources of ready-mix concrete and other materials from suppliers along the Highway 4 corridor.

Although the timing of construction of the proposed facilities is not known in detail, the need to either collect

drainage fees as development occurs within the watershed area or to obtain in-lieu excavation of some of the facilities makes it unlikely that all of the proposed facilities would be under construction at one time. It appears likely that work will be done in increments, over an extended period of time. As a result, truck traffic could be spread over a period of time, possibly up to five years or longer, with each proposed facility generating low volumes of truck traffic as work is performed. Traffic generated by construction worker commute trips will occur in conjunction with construction of the various flood control facilities. Although this traffic is also expected to be split along the northerly and southerly access routes to the general area of the project sites, it is anticipated that most of it will originate along the Highway 4 corridor and beyond.

Because the timing of construction of the various proposed facilities has not been precisely scheduled, it is not known if the Delta Expressway will be constructed prior to buildout of the proposed regional drainage facilities. Because excavation of some of the facilities is already planned, and because development in the general area is occurring rapidly, most or all of the flood control projects may be completed before the expressway and related roadways are completed. For example, some earthwork has been performed on the proposed Dry Creek basin site. This is parklands property in the City of Brentwood. The grading was approved by the City and performed by the developer. The construction trips will have a minor, cumulative effect on the existing local street network. Because of the low traffic volumes, the impacts are not significant.

### 3. Effects of Project Traffic

In summary, construction of the planned drainage improvements would not involve heavy volumes of truck traffic to transport excavated material from the sites. Moreover, construction would occur by increments over an extended period of time. The transportation of earthworking equipment to and from some of the sites, where subdivision developers would be providing excavation in lieu of fees, would require no additional trips beyond those needed by the developer to transport his subdivision improvement equipment. Although project traffic could involve up to 100 or 200 truck round trips for some of the sites, this level of traffic generation would be a relatively minor addition to the overall traffic being generated by the construction of numerous subdivisions and associated roadway and utility improvements. Also, the construction of flood control facilities, unlike residential development, results in no long-term traffic generation other than the minor traffic required for periodic maintenance.

## ENVIRONMENTAL IMPACT ANALYSIS

### 1. Traffic Safety

Impact. Because each of the proposed drainage improvements would generate a relatively modest volume of construction traffic, no significant traffic impacts are anticipated along the roadway routes providing access to the project sites. However, the access routes have only two lanes with limited shoulder area, and vehicle speeds tend to be high, as is characteristic of long, straight stretches of rural roadways. Consequently, there is a potential for traffic hazards at each of the sites, resulting from a) construction within a roadway (such as the pipeline crossing of Fairview Avenue, for the proposed Deer Creek basin), and b) maneuvering of construction vehicles onto and off of the sites (braking and deceleration on the approaches to the sites). These activities could cause congestion of high speed vehicles, resulting in traffic hazards along roadways adjacent to the sites. In the case of the Dry Creek basin, which would require access along the residential streets of Subdivision 6492, construction traffic could result in traffic and pedestrian safety hazards along the minor roadways within developed residential projects.

Mitigation. As part of their contract obligations, construction contractors should be required to provide flagmen, and other traffic control devices as needed, to minimize congestion and traffic hazards during roadway construction at the construction entrances to the sites as well as along residential access routes to sites. To the extent practical, off-loading of construction materials, and queuing and parking of trucks and construction equipment, should occur within the boundaries of the project sites, or outside of public road rights-of-way or travelways. Construction within heavily traveled roadways, such as Fairview Avenue, should include provision of temporary detour lanes to minimize through traffic congestion during busy traffic periods.

### 2. Vehicle Spillage and Dust

Impact. Although construction of the projects would not involve heavy volumes of truck traffic to haul earth to or from the sites, construction traffic could result in local dust and spillage problems around entrances to each site. Aggregate spills, dust buildup on roadways, or dirt tracked onto roadway surfaces adjacent to the sites, could affect traction, particularly in wet weather, and would be a general nuisance.

Mitigation. As part of their contract obligations, construction contractors should be required to keep roadways adjacent to project sites clear of dirt and spillage. Depending on the intensity of the particular construction procedure and the effectiveness of other dust control measures (on-site control), regular street sweeping may be required on a daily basis, or several times a day.

To ensure that any contractor-related problems of this type are quickly corrected, it is recommended that property owners/homeowners associations be informed about construction schedules, work hours and other project details. They should also be provided with the name and work phone number of the project engineer for the Flood Control District, along with an emergency number for use during weekends, holidays and evenings.

### 3. Damage to Roadway Pavement and Improvements

Impact. It is anticipated that truck traffic volumes will be relatively low for the proposed drainage channel improvements. The earthwork will be balanced on-site for the Sand Creek and Deer Creek Reservoir projects. The developer of the subdivision that surrounds the proposed Dry Creek Reservoir is placing material excavated from the Dry Creek Basin site as engineered fill in his project. It is anticipated the material excavated from the proposed Deer Creek Basin and Marsh Creek Channel modification will be needed by adjacent developers for fill in their projects, and that they will use the grading contractor for subdivision improvements to do the earthwork in lieu of paying drainage fees, or as partial payment of drainage fees. Nevertheless, the low volumes of truck traffic could result in damage to roadway improvements, particularly in the areas around the construction entrances to the sites. Such damage could include sagging or broken pavement in weak areas, or the breakdown of paved roadway edges by heavy vehicles.

Mitigation. As part of their contract obligations, construction contractors should be required to repair any damage to local roadways caused by their activities. Before work begins on any project, representatives of the Flood Control District and the contractor should inspect the condition of the roadway(s) providing access to the site. A similar inspection should be conducted after work is completed, to determine the extent of any repairs which will be needed as a result of construction activity. In some cases, depending on the timing of construction of the flood control project, and the timing of construction of adjacent subdivisions and associated roadway improvements, construction damage to roadways, if not immediately hazardous, may be repaired as part of roadway improvements in the adjacent subdivision.

## F. PUBLIC HEALTH AND SAFETY

### SETTING

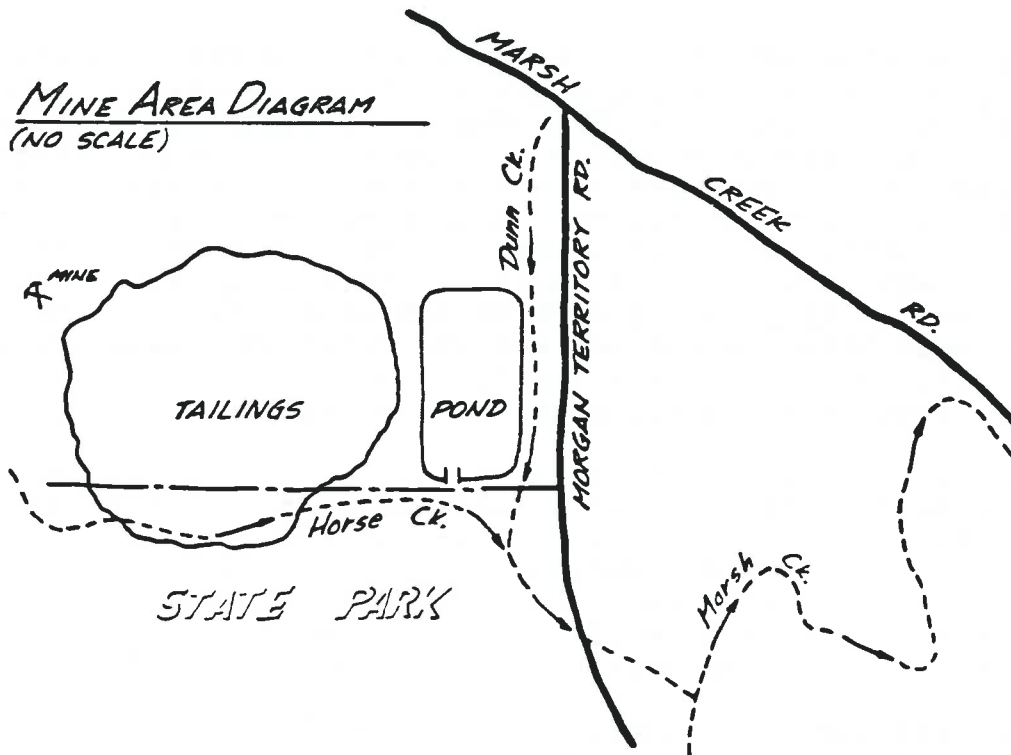
#### 1. Heavy Metal Pollution, Mount Diablo Quicksilver Mine

For a number of years, state agencies and the County Health Department have been concerned about the discharge of heavy metals in surface runoff from the Mount Diablo Quicksilver (Mercury) Mine property. This mine, which was periodically active between 1870 and 1970, is located just southwest of the Marsh Creek Road/Morgan Territory Road intersection, approximately 10 miles west of (and upstream from) the Marsh Creek Reservoir. The mine site includes a tailings/waste pile, and a detention pond which was originally constructed to store drainage from the mine tunnel and the tailings. The pond and tailings are located just above the confluence of two intermittent streams -- Horse Creek and Dunn Creek. The relative locations of these creeks to the old mining works and to the Marsh Creek channel are shown in Figure 22. The detention pond, which now serves to retain runoff from the mine, has been found to contain hazardous levels of nickel and elevated levels of mercury.

Concerns about possible pollution originating from the mine date back at least to the late 1930's, when property owners in the area complained to the State Department of Public Health about mine drainage into shallow wells. During the 1950's, the Department of Public Health inspected the mine a number of times and tested samples of water from adjacent streams. Although discoloration of stream water was observed (thought to be caused by iron being leached from the mine), no evidence of groundwater contamination was found. During the 1960's, numerous complaints about the mine, including turbidity of downstream water and possible mercury pollution, were made to various state agencies and to the County District Attorney. The 1960's was also a period during which the mine was closed, sold, and reopened several times. Heavy rainstorms during the 1960's caused the detention pond to overflow a number of times, releasing water and mud into the adjacent creek channels.

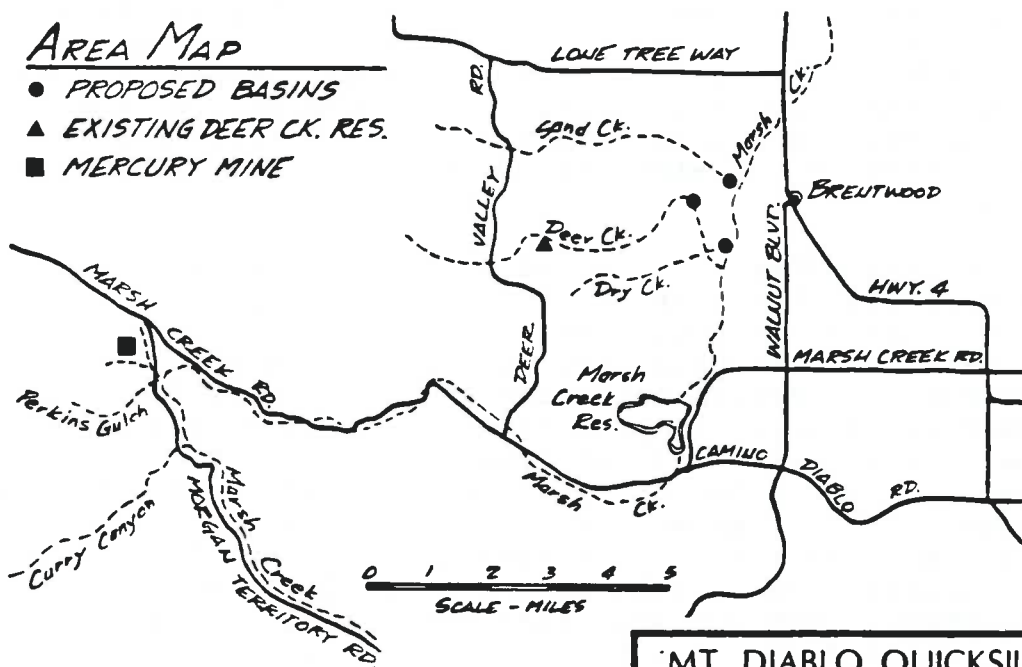
In 1978, the Regional Water Quality Control Board (RWQCB), in order to control runoff from the mine, issued Waste Water Discharge Requirements and a Clean-up and Abatement Order to the current owner of the mine, who had purchased the property in 1974. The primary concern at that time was that the detention pond had filled with sediment and the levees had been breached during rainy weather in the 1960's. The mine owner was required to stop direct discharges to surface water and to submit a proposal for continued compliance. Thereafter, the owner built up the levees to trap sediments in the pond and to minimize the release of heavy metals into Dunn Creek.

# MINE AREA DIAGRAM (NO SCALE)



## AREA MAP

- PROPOSED BASINS
- ▲ EXISTING DEER CK. RES.
- MERCURY MINE



## MT. DIABLO QUICKSILVER MINE DIAGRAM & MAP

SCALE: as shown

DATE: 3-9-90

FIGURE:

22



MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

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A second requirement of the RWQCB directed the property owner to control the sediments which had previously accumulated in the pond. In 1978, the owner submitted a proposal which was rejected by RWQCB because it was found inadequate to protect surface waters in the area. Since that time, no additional proposals have been made, and the mine owner has indicated he is financially unable to comply with RWQCB requirements. The RWQCB is continuing to work on this problem and is pursuing enforcement under the provisions of the Toxic Pits Cleanup Act and the California Water Code. However, because it is a complicated long-standing problem, resolution is not anticipated in the near future.

RWQCB is also concerned about pollution just below the tailings/debris pile which is located adjacent to the mine's detention pond. During active operation of the mine, the tailings pile was allowed to extend off-site to the south, onto property which was later purchased to expand Mt. Diablo State Park (see Figure 22). At the base of this debris, a drainage course has developed which channels surface and subsurface flow to the channel of Horse Creek, a stream which flows eastward just inside of, and parallel to the State Park property line, and discharges into Dunn Creek. Soil samples taken along this channel indicate elevated levels of mercury and nickel, and water samples indicate hazardous or near-hazardous concentrations of mercury in the water. In 1988, because of these findings, RWQCB informed the State Department of Parks and Recreation (DPR) that the park is responsible for the impacts of water discharges originating on Park property, and indicated that DPR should "submit a time schedule and work plan for characterizing the water originating in the mine area of the Park and take corrective action."<sup>8</sup>

The current situation is complicated by the fact that no one knows exactly the source, or the full combination of sources, of heavy metal pollution which has been found in Horse Creek on the State Park property. Cinnebar, the ore mined to produce mercury, occurs naturally throughout the Coast Ranges in narrow, steeply dipping and discontinuous veins. In the zone of weathering, cinnebar may be altered to native mercury, mercury oxide, or mercurous chloride. The Mt. Diablo mercury district extends along the northeast base of Mt. Diablo's North Peak. This area encompasses the Mt. Diablo Quicksilver Mine as well as the Horse Creek and Dunn Creek watersheds. DPR contends that the spring upslope from the mine, which flows into Horse Creek, does not discharge a

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<sup>8</sup> Letter of 9-14-88 from RWQCB to Judy Kannon, p. 2.

sufficient amount of naturally occurring mercury to account for the high concentrations of mercury which have been found along the creek at the base of the tailings pile. Instead, DPR believes the heavy concentrations are the result of surface runoff from the tailings pile. DPR plans, during 1990, to collect surface water samples for chemical testing at various locations along Horse Creek. Their objective is to determine if evidence of mercury contamination is present upstream from the tailings pile.

It should also be noted that, as of 1988, RWQCB had found no hazardous concentrations of metals in Dunn Creek. Selected water wells on properties surrounding the mine have been sampled and do not contain dangerous concentrations of heavy metals. Both surface and ground waters are of poor quality, generally exceeding drinking water standards for salts. However, the poor water quality is a common condition in eastern Contra Costa County, and does not appear to be caused by the mine tailings.

## 2. Other Hazards

The Flood Control District and the City of Brentwood propose that the Dry Creek basin serve both as a detention basin and as a neighborhood park, with park administration, maintenance and security provided by the City of Brentwood. The District has also suggested that the Deer Creek basin could provide these dual functions, and that both the Sand Creek basin and the proposed stretch of Marsh Creek widening could be improved with trails and riparian plantings. No recreational uses are planned at the existing Deer Creek Reservoir. Because substantial residential development will eventually occur around all of the proposed flood control projects (except for the existing Deer Creek Reservoir), improvement of the facilities to attract park use or hiking would necessitate the erection of some type of barrier to prevent access to hazardous areas, particularly by children.

The Flood Control District proposes that the Sand Creek, Deer Creek and Dry Creek basins be enclosed, or partially enclosed, by four-foot high chain link fencing, which could remain in place permanently, or be removed or relocated when and if the basins are improved for park use, or as nature areas. (No fencing is proposed around the improved Deer Creek Reservoir, and no new fencing is budgeted by the Flood Control District along the widened stretch of Marsh Creek.)

It is anticipated that basins would detain runoff only a few times each year, and the ponded waters would drain off in 1 to 24 hours, depending on the volume of the basin, the size of the outfall structure, and runoff characteristics of the storm. During these periods, the maximum depth of water would vary for each basin (maximum depth 13 feet).

## ENVIRONMENTAL ANALYSIS

### 1. Mercury Contamination

Impact. One of the proposed flood-control projects is widening of the Marsh Creek channel between Dry and Sand Creeks. The excavated material is to be placed as engineered fill on nearby land, possibly within the boundaries of new subdivisions located adjacent to the flood control channel right-of-way. The extent to which sediment-bearing heavy metals derived from the Mt. Diablo Quicksilver Mine (and the springs above the mine) may have contaminated the soil in Marsh Creek is not known.

During 1980, the State Department of Fish and Game analyzed fish from the Marsh Creek Reservoir and determined that they contained levels of mercury at or above maximum levels specified by the U.S. Food and Drug Administration. Thereafter, the State Department of Public Resources informed the Department of Water Resources that Marsh Creek Reservoir should not be opened for public recreation due to potential health problems (see Figure 22).

If the soils downstream from the existing Marsh Creek Reservoir are contaminated with heavy metals, it is possible that their use as fill adjacent to the creek could result in hazards to human health or to wildlife. Earthwork to construct the outfall for the proposed Dry Creek basin could also involve contaminated sediments. The proposed Sand Creek and Deer Creek basins, along with the existing Deer Creek Reservoir, are located along secondary channels, well upstream from Marsh Creek. These projects do not have mercury mines (or mercury veins) in their watersheds.

Mitigation. Although no evidence of mercury contamination exists downstream from the Marsh Creek Reservoir, it is recommended that fill materials excavated from the Marsh Creek Channel be certified to ensure that the sediments are not contaminated. If the concentrations are found to be low and that cleanup or further testing are not warranted, the sediments could be used for levee construction or as fill in areas adjacent to the creek. If the sediments are contaminated, mitigation measures acceptable to the RWQCB would be required. For example, it might be found that the contaminated fill should be placed outside the Flood Control District right-of-way, and buried beneath "clean" fill.

### 2. Drowning Hazard

Impact. Although the proposed flood control facilities are expected to detain runoff only a few times each year, unrestricted access to all areas of the storage basins, and unrestricted access between residential developments and

Marsh Creek could be hazardous during these periods, especially if regular access is stimulated by the improvement of such facilities as park, trail, and nature areas. The most hazardous features of the flood control basins would be the areas adjoining outflow structures, including the areas of debris catchers (trash racks) in front of these openings.

Mitigation. The minimum mitigation for the proposed facilities should be the provision of fencing and signing, specifically around both the inlet and outflow structures, and to design the trash rack to prevent access to the outfall structure by children. The fencing should be of sufficient height and design to discourage children from attempting to enter these areas. Additional access restrictions which should be considered include the following:

- a. Retain the four-foot high chainlink fences which the Flood Control District proposes to construct around three new detention basins, even if the basins are improved as park or nature areas.
- b. Basins in areas which are open to use by visitors should be equipped with gates and latching devices which cannot be readily operated by small children (possibly self-closing, self-latching devices similar to those required for swimming pool fencing). Such devices could be particularly important in situations such as the proposed Dry Creek basin, where the basin would be readily accessible from dwelling units directly across the street.
- c. Provide signing at the gates, warning visitors of possible hazards.
- d. If aesthetic characteristics of the chainlink fencing poses a problem, a landscape architect could be retained to develop a planting scheme to soften views of the fence.
- e. The slope gradients within the basin should be kept to 4:1 (horizontal to vertical) or flatter.

If a local park agency takes over responsibility for basins and/or the Marsh Creek Channel modification area for active recreational uses (e.g. trails, informal sports play areas, picnic areas), the fencing requirements should be adapted to standards appropriate for the intended use.

## G. NOISE

### SETTING

There are no major stationary sources of noise generation in the general area of the project sites. The existing noise environment is characterized by noise from local roadway traffic, periodic operation of agricultural equipment and vehicles, and miscellaneous noise sources associated with increasingly dense residential development, including varying degrees of short-term construction noise resulting from the development of new subdivisions and associated roadway and utility improvements. The Contra Costa County Noise Element (1975) identifies traffic along Lone Tree Way, north of the project area, and along Highway 4, east of the project area, as the primary sources of noise in the overall area. Along these routes, the Noise Element projects 1990 average daily noise levels (CNEL) of 60+ dBA extending no more than 100-200 feet beyond the roadways.

The detention basins would generate noise during construction, and when routine maintenance was performed. Because of the relatively short duration of construction and maintenance noise, the proposed projects would not result in significant noise impacts. With the exception of the existing Deer Creek Reservoir, which has a relatively isolated location, all of the proposed projects are located in areas where various phases of development of the projects could result in construction noise which would be a nuisance to nearby residents or future residents. The proposed Sand Creek and Deer Creek basins are located along the developing Fairview Avenue corridor, within areas designated in the General Plan for low-density residential development. The proposed Dry Creek basin is located in an area designated for high-density residential development, and the stretch of Marsh Creek which is proposed to be widened passes through mostly vacant land designated for low- and high-density residential development (generally south of Dainty Avenue, and developed residential neighborhoods north of Dainty Avenue). For most of the projects, however, the potential for construction noise impacts on nearby residential development would be reduced to the extent that developers of nearby residential projects would conduct the required excavation of flood control sites as part of their overall subdivision earthwork. This procedure, which has been planned for the Dry Creek basin and a portion of the Marsh Creek widening, would result in at least the first phase of construction (the heavy earthwork) being completed prior to occupancy of adjacent, new residential units.

Normal construction working hours would be from 7:00a to 4:30 or 5:00p, possibly with some work on Saturdays, unless contracts specifically preclude weekend work. Equipment to be used on the various sites would include front end loaders, backhoes, dozers, scrapers, compactors, various sizes

of trucks, pavement breakers and paving equipment (at roadway pipeline crossings) and miscellaneous equipment, including compressors and power hand tools, with the mix of equipment and the duration of equipment use varying from site to site. Table VIII provides a list of typical types of construction equipment, their maximum noise levels, and noise reduction methods.

## ENVIRONMENTAL ANALYSIS

Impact. Although the proposed projects would result in no significant long-term noise impacts, short-term construction activity would periodically generate high levels of noise which would be a nuisance to nearby residents. Similarly, maintenance activities, such as removal of sediment from the basin every 10 years<sup>+</sup> could be disturbing. With the sizes and types of equipment expected to be used for the various projects, maximum noise levels of 85 to 92 dBA at 50 feet would be typical. With regard to interior noise, standard residential construction methods generally reduce outdoor noise by 24 to 28 dBA, with windows closed and with no significant cracks or openings around windows or doors. However, if windows are open, interior noise levels will be only 10 to 15 dBA less than outdoors. Thus, during construction of the projects, the worst-case condition for residential interiors within 50 feet of the operating equipment, with windows open, would be periodic noise levels on the order of 70 to 80 dBA; with windows closed, the worst case would be noise levels of around 70 dBA.

Mitigation. A reasonable target for construction equipment noise (excluding pavement breakers) is a maximum of 85 dBA at 50 feet. This level of noise can be maintained either with new equipment or with older equipment which incorporates quieting modifications. If the following measures were incorporated into the project construction procedures, noise intrusion into the residential areas adjacent to the work areas could be kept to a practical minimum:

- a. Using construction equipment which is of quiet design, has high quality muffler systems, and is well maintained
- b. Installing superior mufflers and engine-enclosure panels on gasoline and diesel machines
- c. Avoiding unnecessary idling of equipment not in use
- d. Using good maintenance and lubrication procedures to reduce operating noise
- e. Where sensitive receptors adjoin work areas, restrict construction activities Monday through Friday, 8:00a to 5:00p, with no weekend or holiday work

- f. Keeping nearby residents informed of planned work schedules and anticipated completion dates, so that periods of disturbance are known ahead of time.

TABLE VIII  
NOISE LEVELS OF CONSTRUCTION EQUIPMENT <sup>9</sup>

-CONSTRUCTION EQUIPMENT                      NOISE LEVEL At 50 FEET (Dba)

Earthmoving

Front Loader	79
Backhoes	85
Dozers	80
Tractors	80
Scrapers	88
Graders	85
Trucks	91
Paver	89

Materials Handling

Concrete Mixer	85
Concrete Pump	82
Crane	83
Derrick	88

Stationary

Pumps	76
Generators	78
Compressors	81

Impact

Pile Drivers	101
Jack Hammers	88
Rock Drills	98
Pneumatic Tools	86

Other

Saws	78
Vibrators	76

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<sup>9</sup> Source: Bolt, Beranek & Newman, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, EPA, 1971.

## H. AIR QUALITY

### SETTING

The air quality characteristics of the East Contra Costa Area are considered to be generally similar to those that prevail in the Central Contra Costa Area. The nearest permanent air quality monitoring site is located in Pittsburg. Data on air quality readings at the Pittsburg station, obtained from the Bay Area Air Quality Management District, indicate that applicable state and federal standards for carbon monoxide, nitrogen dioxide, and sulfur dioxide were not exceeded during the six-year period 1983 through 1988. The standard for ozone was exceeded up to 3 days per year during this six-year period. The data collected at the Pittsburg station are considered to be representative of conditions in the area of the project sites.

Ozone is not released directly by any source, but is formed in the atmosphere. Two common pollutants, hydrocarbons and oxides of nitrogen, react in the atmosphere in the presence of sunlight to form photochemical oxidants, primarily ozone. The reactions take several hours to occur, so that ozone levels in the project sites are, to a large extent, the result of emissions occurring upwind in the Greater Bay Area. In the area of the sites, the prevailing wind direction is from the west, reflecting the dominant sea breeze passing through the Carquinez Strait. The winds average over 12 miles per hour at Pittsburg, where the nearest permanent wind measuring sites are located, but may exceed 20 miles per hour during afternoon periods in the spring and summer months.

The completed flood control projects would not result in long-term traffic generation, except for infrequent traffic for maintenance. Therefore, the projects would have no adverse, long-term air quality impacts. During various phases of development, emissions from construction and material hauling vehicles would not result in significant air quality impacts. Unless properly controlled, dust generated by construction activities could be a substantial short-term nuisance to downwind residents.

### ENVIRONMENTAL ANALYSIS

Impact. Although development of the proposed flood control projects would result in no significant long- or short-term air quality impacts, dust generation during various phases of construction activities could be a substantial nuisance to nearby residential properties and to motorists along roadways adjacent to the sites.

Mitigation. The Bay Area Air Quality Management District recommends that during clearing, grading, and earthmoving or excavation, water trucks or sprinkler systems be used in sufficient quantities to prevent raised dust from leaving project sites. After earthworking activities are completed, recommendations include the following:

- a. Seeding and watering until grass cover is grown. (The preliminary construction budget for each of the proposed projects includes hydroseeding for erosion control.)
- b. Spreading of soil binders.
- c. Sufficiently wetting-down the work area to form a crust on the surface, with repeated soakings as necessary to maintain the crust and prevent dust pickup by the wind.

The Air Quality Management District also recommends that the contractor or project sponsor designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite.

## I. CULTURAL RESOURCES

### SETTING

#### 1. Archaeology

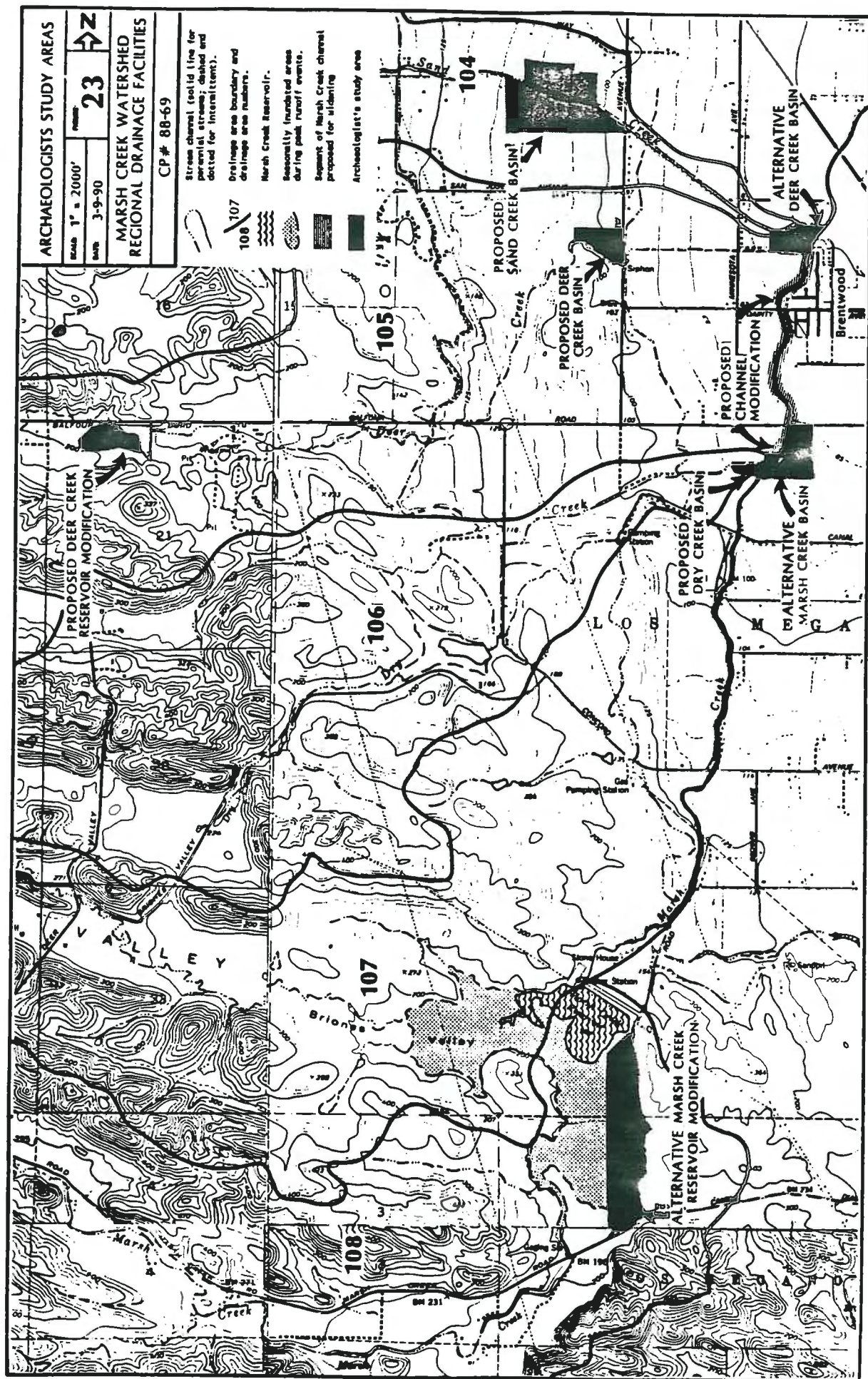
During 1989 Holman & Associates, archaeologists, performed a reconnaissance investigation of the three (3) proposed detention basin sites, along with the segment of the Marsh Creek channel between Dry and Sand Creeks. Archaeologic studies were also performed at the sites of the existing Marsh Creek and Deer Creek Reservoirs. Finally, at the request of the EIR consultant, two alternate detention basins sites were studied:

- a. An on-channel basin located on Marsh Creek, a short distance south of Balfour Road
- b. An on-channel basin on Deer Creek, just above its confluence with Marsh Creek.

The location of the archaeologist's study area is shown in Figure 23.

Literature Survey. Prior to actual field investigation, a record search was made to determine if recorded archaeologic sites were known in the vicinity of planned improvements. The Information Center, California Archaeological Inventory, Sonoma State University, is the regional clearinghouse for information on known sites in the San Francisco Bay Region. This phase of the investigation revealed that there are no recorded sites in the immediate vicinity of the proposed drainage improvement projects. There are recorded sites in the general area of the John Marsh House, which is located downstream from the existing Marsh Creek Reservoir. Because there are no planned improvements in the area of the Marsh Creek Reservoir or John Marsh House, further investigation of this site was not required.

Field Inspection. Except for the proposed Sand Creek basin, where fields were walked in 100-foot transects, each study area was traversed by a trained archaeologist, walking a "grid" composed of either 20 or 50-foot wide transects. The objective of the field reconnaissance was to inspect the ground for indications of aboriginal use or occupation. All drainage areas and adjacent flats were checked carefully. No aboriginal archaeological materials were found. The typical artifacts that would occur within an archaeologic site might include any or all of the following: a) midden soil, b) shellfish remains, c) bone or stone material which showed evidence of use, d) fire-cracked rock, e) modified lithic materials, and f) historic debris and features (fire pits).



Findings. The visual archaeological field reconnaissance of the project areas revealed no indicators of archaeological or historical materials. It is the opinion of the archaeologist that there remains little potential that future earthmoving will impact any historic materials. Nevertheless, there remains some potential that the construction of basins and the widening of the existing channel may impact prehistoric materials which are buried or obscured by groundcover.

Archaeologists have little knowledge about settlement patterns of native Americans in Contra Costa County. Prehistoric sites have, in the past, been recorded in two specific environments with little or nothing found in-between. Prehistoric settlements are repeatedly found at the edge of the foothills where they merge into the floodplains which comprise the land around Brentwood, and again nearer the actual Carquinez/San Joaquin River edge. Settlement seems to have filled in the space between the foothills and the water's edge only south of the towns of Pittsburg and Antioch, where the foothill environment continues north almost to the river.

Combined ethnographic research and archaeological research carried out in the Clayton area over the years suggests that vast tracts of land were utilized by one or perhaps two tribal groups, stemming from a main village site and using seasonal or temporary encampments throughout the large catchment area. The foothills would have been used as a hunting area and for the collection of acorns in the fall, the shoreline again providing a source of hunting and fishing, as well as a natural conduit for travel to the delta and points north. The flat plain of the valley, however, remains somewhat a mystery; some hunting may have occurred, and grass seeds could have been exploited during the late spring.

In archaeological terms, the question is whether or not these areas were simply visited from nearby camp or village sites located either in the foothills (such as the settlement in the vicinity of the Marsh House) or from encampments along the shoreline. If the area actually supported any kind of settlements, these would have been located along the creeks which are a focus of this improvement project: Marsh Creek, Deer Creek and Sand Creek would have provided both the shelter of the riparian environment for the birds, fish and other game associated with it, and most importantly, the water needed for daily life.

It would appear however, that the creekside environments inspected for this study either did not contain such encampments, or their remains are effectively obscured by many hundreds of years of flooding and more recent historic alteration of the landscape. Many of the waterways appear to

have been channelized and/or moved from their original locations.

Inspection of creekbanks throughout the project area suggest that silting has been an on-going process which could have buried or obscured prehistoric resources over wide areas. Over the past 30 years, numerous examples of buried archaeological sites have been found adjacent to watercourses throughout the counties of Contra Costa and Alameda, buried under as much as 10 feet of silt in some instances.

## 2. Historic Resources

The John Marsh house, located about a mile west of Walnut Boulevard in the Marsh Creek watershed is on the National Register of Historic Places (NRHP). Figure 24 shows the location of historic resources of local significance in the Marsh Creek watershed, and the accompanying Table IX provides information on their importance. They include sites of historic events, structures of historic significance and architectural specimens. None of the other sites are on the NRHP.

## ENVIRONMENTAL ANALYSIS

### 1. Archaeology

Impact. There is potential for buried prehistoric cultural resources in the areas planned for drainage improvements.

Mitigation. Further archaeological field investigations are not deemed necessary by the archaeologist. It is recommended that construction personnel involved in future earthmoving activities be alerted to the potential for discovery of prehistoric materials. This could be done most effectively by conducting a half-day seminar for the field management personnel of each subcontractor involved in making excavations, along with the construction manager of the projects for the County. Such a seminar would utilize a slide presentation and the exhibition of artifacts and other indicators of cultural materials which might be encountered during creek widening or the construction of new basins.

Training of this type should allow for the early identification of archaeological deposits. Any materials noted during construction would then be brought to the attention of a qualified archaeologist who would inspect the finds before construction could resume within 100 feet of the discovery. The archaeologist retained to inspect the find(s) would be responsible for making any necessary recommendations for the further scientific evaluation of the finds, and for developing a program of mitigation of impacts to those resources endangered by continued earthmoving, should mitigation be

deemed necessary. In the event that human remains are discovered, steps would be taken by the archaeologist in charge to comply with prevailing state laws concerning their identification, removal and reburial.

If prehistoric materials are uncovered during development of the property, all work within 100 feet of the find should be stopped, and the Contra Costa County Community Development Department should be notified within 24 hours. The District should retain a qualified archaeologist to evaluate the significance of the find. The archaeologist should prepare a report that documents the investigation and provides recommendations for any mitigation measures that may be deemed necessary.

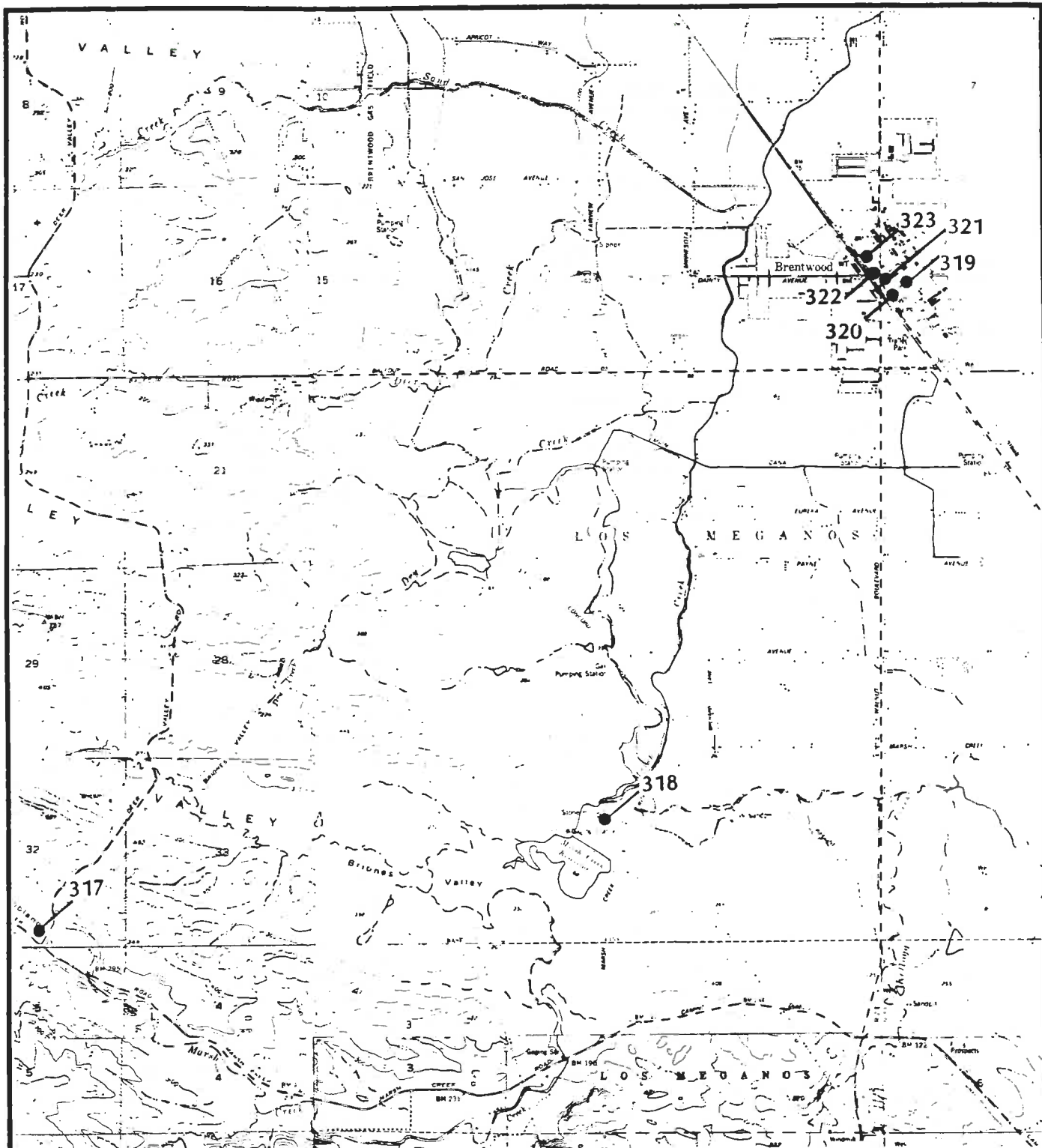
## 2. Historic Resources

Impact. Project construction will not affect any known archaeological or historic resources. The project will reduce the potential for flood damage to the structures of local historic significance located in the core area of Brentwood.

Mitigation. None required.

TABLE IX  
HISTORIC RESOURCES INVENTORY  
MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

SITE #	RESOURCES/ LOCATION	EVALUATION CATEGORY	SIGNIFICANCE/ IMPORTANCE
317	LIBERTY GRAMMAR SCHOOL Deer Valley and and Marsh Creek Roads, Brentwood	Site of Historic Event	The site of an early gram- mar school in the area.
318	JOHN MARSH HOME Marsh Creek Road 2-1/2 Miles South of Brentwood	Structure of His- toric Significance/ Architectural Specimen	John Marsh, doctor and first Anglo-American set- tler in the County was born June 5, 1799 in Danvers, Massachusetts -- pioneered westward and eventually bought the Ranchos Los Meganos (13,316 acres) from Jose Noriega. He married Abby Tuck in 1851 and in 1852 started the mansion for his bride. The mansion known as the "Stone House" was completed in 1856; however, it was never lived in by the Marshes. Abby died in 1855 and John was murdered Sept. 24, 1856. The home is listed on the National Register of Historic places.
319	JEWETT HOUSE 600 First Street Byron	Structure of His- toric Significance	"TO BE DOCUMENTED"
321	JUDGE WALLACE CHAMBERS 300 Oak Street Brentwood	Structure of His- toric Significance	One of the oldest Build- ings in Brentwood and used as Judge Wallace's Chambers.
322	MURPHY HOME 800 Railroad Avenue Brentwood	Structure of His- toric Significance/ Architectural	Home of early resident in the area and built around 1909. A Victorian style Structure.
323	WALLACE HOME 828 Railroad Avenue Brentwood	Structure of His- toric Significance/ Architectural Specimen	Home of early resident in area and built around 1909. A Victorian style structure.



323 Local Historic Site (site of historic event, architectural specimen or historic building)

Source: Preliminary Historic Resources Inventory (1976)

# HISTORIC RESOURCES MAP

SCALE: 1" = 4000'

DATE: 3-9-90

FIGURE:

24



MARSH CREEK WATERSHED  
REGIONAL DRAINAGE FACILITIES

CP# 88-69

## J. VISUAL QUALITY

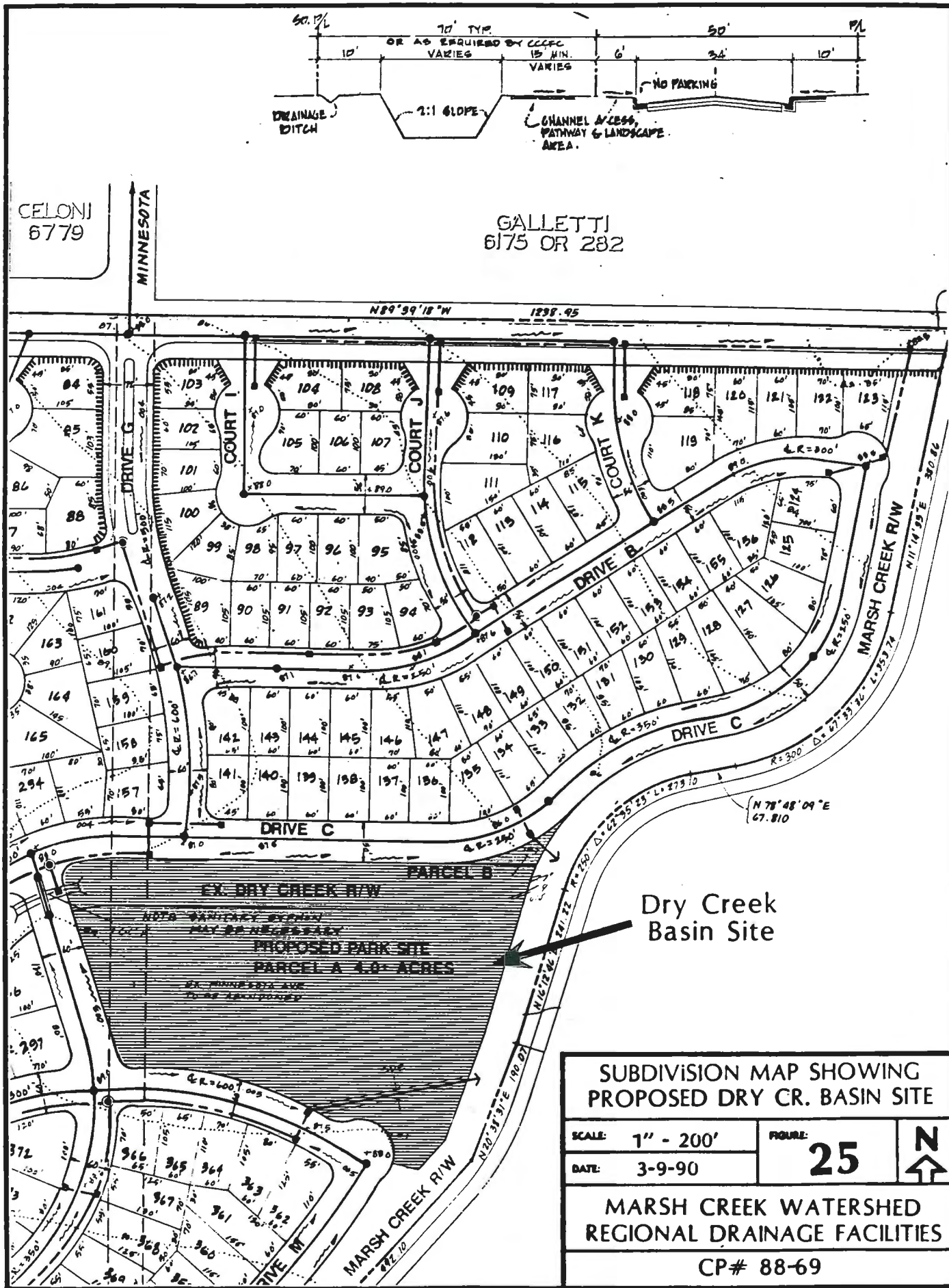
### SETTING

The Marsh Creek watershed has experienced rapid urban development during the past decade. However, the development is chiefly west of Fairview Avenue in Brentwood, and further north in Oakley. Most of the land in the Dry Creek, Deer Creek and Sand Creek watersheds is currently used for agriculture, with scattered homes and ranchettes dotting the landscape. At the base of the foothills, near the mouth of the watershed, small grains and pasture predominate. Aesthetically, this landscape does not project a sense of major open space because most of the parcels are forty acres or less. When driving along the grid-like network of roads, the orchards tend to break up most views of the foothills and Mt. Diablo. Residents of the floodplain find themselves in a pastoral area, disturbed only by the occasional truck or farm vehicle.

The area upstream from the floodplain is characterized by the undulating topography of the foothills, which produces the feeling of an expansive, major open space area. The occasional oak provides an even more serene setting. Unobstructed views of Mt. Diablo are available from many vantage points, and existing land use is limited to grazing and a few small, single-family homes. Wind farms are limited chiefly to ridgecrests in the upper portion of the watershed. Traffic volumes are relatively low at present, so traffic-related noise is minor.

The sites of the proposed Deer Creek and Sand Creek detention basins are also very rural and open in appearance at present. They are framed on the west and south by rolling hills with Mt. Diablo in the background. However, the proposed Deer Creek and Sand Creek basins are in the developing Fairview Avenue corridor. The Dry Creek basin is bounded on the east by a cherry orchard, but lands immediately north, west and south of the basin are part of an approved residential subdivision (see Figure 25).

Impact. The existing visual character of the project sites is gentle and bucolic; the land and vegetative forms are soft, rounded and undulating; the dominant lines in the landscape are smoothly curvaceous. The more sharp lines of Mt. Diablo highlight its prominence as a peak. The landscape's texture is visually soft -- the rolling hills look as though they are covered with carpeting. The scattered trees provide a coarse textural contrast to the soft grasses. The color varies seasonally, but appears in earth tones of green and brown most of the time. The Diablo range in the background is a contrasting blue/gray, which further accents its presence. Travelers along Fairview Avenue,



Sand Creek Road and Balfour Road, as well as nearby residents are the primary viewers of the sites. Short and medium-range views of the Deer Creek and Sand Creek sites will be available from Fairview Avenue, and minor streets around the perimeter of the Dry Creek Basin will provide short range views of that basin. No long range views of the basins will be available. Public views of the 7000-foot reach of the Marsh Creek channel that is proposed for modification are available from roadway crossings of the channel (e.g. Balfour Road and Dainty Avenue). Short-range views are also available from properties that front along the Flood Control District's channel right-of-way.

Mitiation. Significant native vegetation will be preserved where possible. This shall include the large cottonwood and willow trees in the vicinity of the proposed control structure for the Dry Creek basin. Trees to be preserved will be identified and flagged in the field prior to construction activities. Construction crews should be informed of the sensitivity of the vegetation and the need to operate with caution in the vicinity of the trees.

Groundcover, trees and shrubs will be planted in the Dry Creek basin, and these plantings will be maintained by the City of Brentwood. It is recommended that all plantings be irrigated during establishment (maximum two years), and that the basin be designed so that low flows would be routed through the basin, providing a wetland habitat. Primarily drought-tolerant, native species shall be used. Graded areas within the basin and perimeter dikes will be hydromulched and hydroseeded with grasses and forbs to control erosion and discourage the establishment of undesirable plant species.

The City of Brentwood is also evaluating the potential to establish parklands in the Deer Creek and Sand Creek basins as well as hiking, bicycle and equestrian trails along the main channel of Marsh Creek. Whatever the outcome of their deliberations, it is recommended that the design of the Sand Creek basin contain landscape mounds. Any mounds or levees that face public roads should be contour-graded and planted with groundcover, trees and shrubs. The plant materials selected should emphasize the use of native species.

#### **IV. CEQA REQUIRED ASSESSMENT**

##### **A. GROWTH INDUCING IMPACTS**

Flooding in the Marsh Creek watershed causes damage to property, but not loss of life, because the floodplain is flat and water spreads out quickly. In a 100-year event, water depths on the floodplain average two feet.

Contra Costa County now requires that all new structures for human occupancy be protected from flood damage. Typically, this is achieved by requiring that the first floor be elevated above the maximum water surface during peak runoff from the 100-year flood. However, many older buildings, along with roads and other improvements are subject to water damage. Ponding on floodwaters also results in damage to agricultural crops.

Elsewhere in the County, flood hazards have not prevented development in the floodplain. It has only served as a constraint on design of new developments. The basic requirement of the subdivision ordinance is to collect surface waters and convey them to a natural drainage channel, or an adequate storm drainage system. The Subdivision Map Act does not make developers responsible for improving inadequate natural channels, such as Marsh Creek. In some larger developments, such as the Blackhawk Country Club, developers have been required to construct privately maintained detention basins.

Regardless of whether or not the 100-year floodplain is reduced by the proposed regional drainage facilities, it is not expected to induce growth. Development is controlled by the General Plan and zoning. Sizeable acreages of the floodplain area in Brentwood, Oakley and the Bethel Island Specific Plan Area are designated for urban land uses. These general plan and specific plan designations treat flooding as an engineering and design issue, not as a prime control on land use. Moreover, development is proceeding at a rapid pace in the Sand Creek watershed. Development is also proceeding in those portions of the Dry Creek and Deer Creek watersheds, which are within the corporate limits of Brentwood.

##### **B. UNAVOIDABLE IMPACTS**

Unavoidable adverse impacts are defined as those which cannot be totally eliminated by available mitigation measures. The key issues in identifying unavoidable adverse impacts is the application of proposed mitigation measures. The

enumeration of these impacts below assumes that the mitigation measures recommended in each of the DEIR sections can be effected.

1. Intrusion of manmade drainage facilities that require maintenance into the channel of a perennial stream.
2. Loss of riparian vegetation, along with ornamental and orchard trees.
3. Traffic-related problems during construction, including possible delays and congestion at the entrance to detention basin sites and possible tracking of mud and rock onto roads.
4. Noise intrusion and air quality effects during construction.
5. Accelerated erosion and sedimentation in the channel downstream from the basins for up to two or three years after construction of the project.
6. Loss of 106.5 acres of prime farmland.
7. Energy consumption by construction vehicles.
8. Disruption to residents within/adjacent to work sites during the construction period.
9. Construction of the basins would alter the visual character of the basin site.
10. Construction of the basins would introduce some contaminants, which would become mobilized by surface runoff. In concentrations typical of grading sites, the water quality effects would not be toxic to wildlife.

#### **C. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

The project will require a commitment of acreage to rights-of-way. Most of the land required is currently in private ownership. However, the Flood Control District presently owns acreage within the proposed Sand Creek basin, and nearly 100% of the modification of the Marsh Creek Channel would be done within the existing right-of-way. Construction, operation and maintenance of the flood control facilities will require irretrievable commitment of energy, material and finances.

#### **D. SHORT-TERM VERSUS LONG-TERM USES OF RESOURCES**

The proposed project is compatible with the projected future long-term uses of the area's land, water, and other natural resources. The project also conforms to the established goals of the Flood Control District, Contra Costa County, along with the cities of Brentwood and Antioch, to provide protection from serious flooding.

The proposed project is consistent with the goals of the General Plan, the affected local jurisdictions, and it complies with the various state and federal environmental statutes.

#### **E. ALTERNATIVES**

The recommended plan calls for establishing three (3) new detention basins, widening a 7000 lineal foot reach of the Marsh Creek channel, and increasing the volume of the existing Deer Creek Reservoir so that it has sufficient capacity for the 100-year storm. Various alternatives were formulated to solve the existing flooding problem on the main stem of Marsh Creek. For each alternative, consideration was given to available information on environmental and hydrologic constraints. Consideration was also given to current local, state and federal policies and guidelines. The goal was to develop a plan that would be economically feasible and environmentally acceptable.

In evaluation of alternatives, various assumptions were made about future conditions in the watershed. The principal assumptions are as follows:

- a) Calculations of surface runoff in the watershed are based on the assumption that development will conform to the standards of the prevailing Zoning Districts and General Plans.
- b) Designs were based on soil survey data from the Soil Survey of Contra Costa County (1975). At the time of final design, more detailed soil investigations and surveys will be conducted. It is possible that these could lead to changes in the design, and that actual construction quantities could vary from the present estimates.
- c) Unit prices presented in the engineers' report are based on 1995 dollars. Actual unit prices will depend on costs at the time each construction contract is awarded.

- d) The estimated sediment yield rate is based on existing conditions in the watershed. Intensified development in the future could yield an increase in the rate of sedimentation unless the development includes sediment control measures. Any additional sediment will have to be removed and O&M (Operation and Maintenance) will increase.

## 1. No Project Alternative

If a project is not installed, the flood damages will continue. This includes damages to property and buildings, their contents, and motor vehicles; sediment cleanup operations; loss/damage to agricultural crops; emergency services; and damage to roads, bridges and culverts. Additionally, road closures and rerouting of traffic would continue. The hydrology study prepared by the Flood Control District indicates that peak flows from the 100-year flood will increase by 1200 cfs (from 2000 to 3200 cfs) on Marsh Creek downstream from its junction with Sand Creek. This 60% increase in peak flows is a predictable result of buildout of the current general plans of Antioch, Brentwood and Contra Costa County. It will result in a significant worsening of the flooding problem faced by downstream property owners.

## 2. Alternative Sites for Detention Basins

Two alternative basin sites were examined, along with modification (enlargement) of the existing Marsh Creek Reservoir. These basins are described individually below and their locations are shown in Figure 23.

Marsh Creek Basin. This basin takes a 1200 foot reach of the Marsh Creek channel, located immediately upstream from Balfour Road, along with an existing cherry orchard located east of the channel. The stream gradient is gentle and there are no drop structures. Consequently a broad, shallow basin would be required at this locale (i.e., it represents an inefficient use of land).

Riparian vegetation is present along the reach of channel that is within the Marsh Creek basin. Preservation of this vegetation would require added engineering and cost. Moreover, this basin has such limited volume that it would not eliminate the need for the proposed Dry Creek, Deer Creek and Sand Creek basins. However, the volume of those three (3) basins (and their acreage) could be reduced if the Marsh Creek basin were constructed. The experience of the Flood Control District is that a few regional basins are preferable to a chain of small basins. Using that rationale, three regional basins are preferable to four smaller basins.

Deer Creek Basin. Figure 23 shows an alternate site for the Deer Creek basin. This site is located at the confluence of Deer Creek with Marsh Creek. There is a new, ranch style house within the basin site, and the stream gradient is gentle. This basin was rejected because it requires more acreage to achieve the same capacity as the recommended basin site on Deer Creek.

Marsh Creek Reservoir Modification. As noted previously, the January 2-4, 1982 storm filled the existing reservoir to capacity, and the surplus water (beyond capacity) was conveyed into the downstream channel, resulting in overbank flooding at constrictions in the channel. This problem could be corrected by expanding the size of the existing Marsh Creek Reservoir. This alternative was rejected for two reasons. First, it was relatively expensive because Marsh Creek Road would need to be realigned and significant grading would be required. Secondly, there is so much development anticipated on the lower portion of the watershed that modification of the Marsh Creek Reservoir would not eliminate the need for some downstream basins. Certainly, the Sand Creek basin would be required, and eliminating the Dry Creek basin was not a major cost item because the land was provided by the City of Brentwood. Moreover, the Marsh Creek Reservoir modification would not necessarily nullify the need for the Deer Creek basin, unless the size of the existing primary spillway in the existing Marsh Creek dam could be reduced in its capacity.

### 3. Enlarging Existing Channel

The proposed project calls for enlarging a 7000 foot reach of Marsh Creek in conjunction with the detention basins that are proposed. However, in lieu of the basins, the entire length of channel between the existing Marsh Creek dam and its junction with the San Joaquin River at Big Break could be improved to carry peak runoff from the 100-year storm. Since the existing trapezoidal earth channel was designed for the 50-year storm, the entire reach of creek would need to be improved. The disadvantages of this alternative are that it would a) involve loss of riparian habitat, b) create a potential for severe erosion/sedimentation problems, c) would require acquisition of private land along one or both sides of the creek from the junction with Dry Creek to the mouth of Marsh Creek, d) could result in displacement of some families, and e) would be significantly more expensive than the proposed project.

### 4. New Bypass Channel

A floodwater bypass pipeline or alternate channel concept was investigated. The bypass pipeline/channel would intercept runoff at or near the junction of Dry Creek with Marsh Creek, and convey runoff from the upper watershed easterly

across the Delta Plain to Indian Slough. This is a distance of approximately six (6) miles. This alternative would require acquisition of developing suburban residential and commercial lands in Brentwood. The land acquisition costs alone are far more than the total cost of the proposed project.

#### F. CUMULATIVE IMPACTS

Cumulative impacts are defined as two or more separate impacts which, when considered together are considerable, or which compound or increase other environmental impacts (California State CEQA Guidelines, Section 15355). Cumulative impacts can result from individually minor but collectively significant projects taking place over time in different but spatially-related locations.

Figure 26 illustrates the regional communities which are, at least partially, within the Marsh Creek watershed. They include the Cities of Antioch and Brentwood, along with the unincorporated communities of Oakley and Bethel Island. Taken together, this regional vicinity encompasses approximately 50 square miles. Although the region has additional unincorporated and developable lands, the vast majority of development is planned to occur in these four (4) communities. The four planning areas are the subject of the following recent or ongoing, long-term planning documents:

- a) Brentwood Community Development Plan, adopted 1983; and the Triad Development Annexation Project, approved by Brentwood in 1988 and approved by LAFCO.
- b) Antioch General Plan, adopted December 1988.
- c) Oakley/North Brentwood Area General Plan, pending action by the Board of Supervisors.
- d) Bethel Island Area Specific Plan and Bethel Island Area General Plan, pending action by the Board of Supervisors.

Antioch is only affected indirectly, because it is outside of the floodplain. However, runoff from southeast Antioch drains to Marsh Creek via Sand Creek. The Bethel Island planning area takes its access across Marsh Creek, and most of it is in the floodplain.

The proposed drainage improvements are a part of the infrastructure, along with roads, utilities and community services that are essential to urbanization of the floodplain. The cumulative impact of the project, along with other infrastructure facilities, is as follows:



Proposed drainage area

# REGIONAL COMMUNITIES MAP

SCALE: 1" - 2 mi

FIGURE:

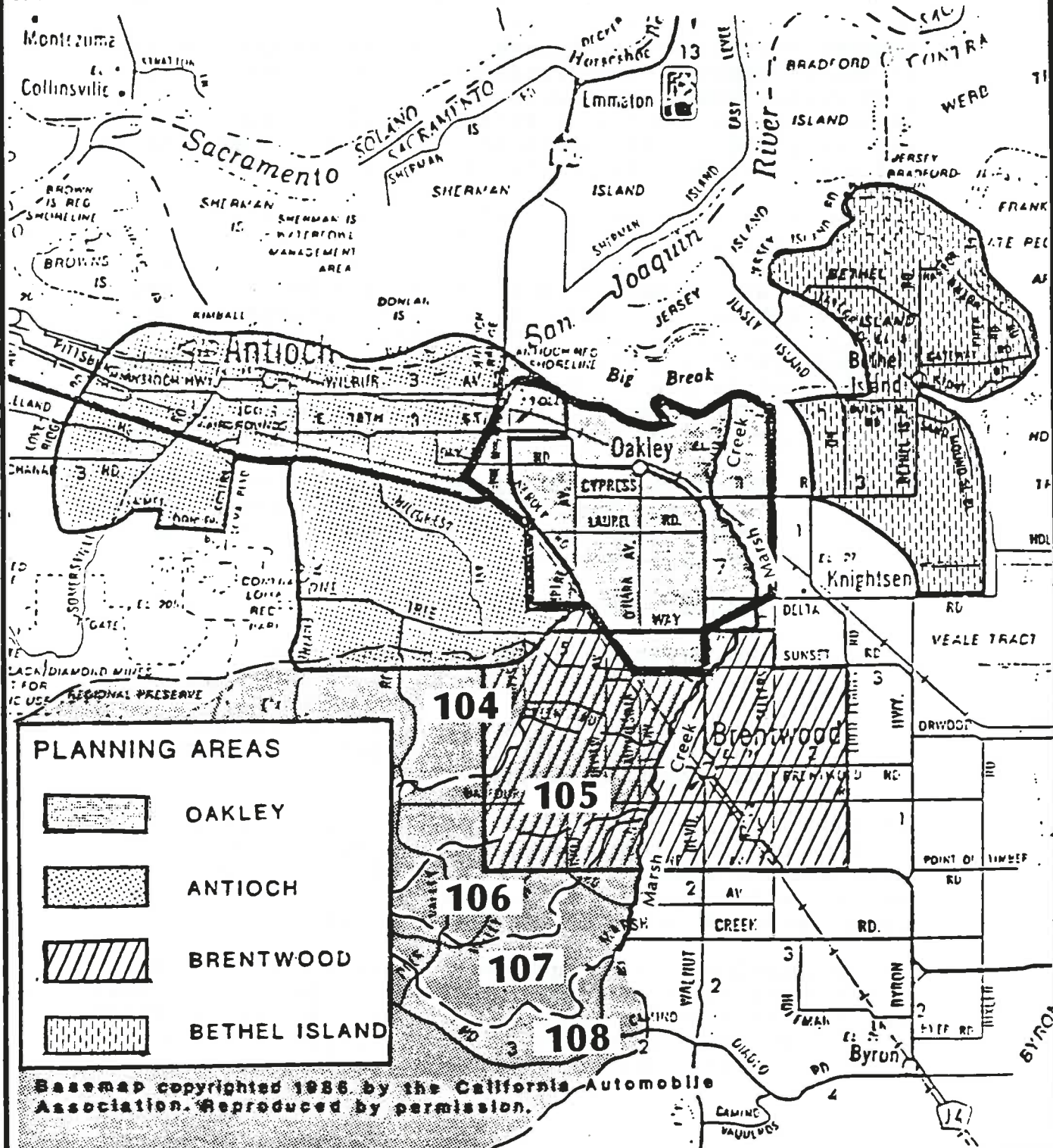
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DATE: 3-9-90

## MARSH CREEK WATERSHED REGIONAL DRAINAGE FACILITIES

CP# 88-69



- a) Geology and Seismicity. The geologic hazards in the communities of Oakley and Brentwood are not a significant constraint on development.
- b) Biologic Resources. Development in the Marsh Creek floodplain will have a cumulative impact on wildlife habitat and vegetation.
- c) Land Use. The proposed project could add to the on-going large scale conversion of agricultural lands in the floodplain to residential and commercial uses.
- d) Agricultural Resources. Development in the Brentwood and Oakley portions of the floodplain will result in conversion of approximately 2000 acres of prime and non-prime farmlands to urban uses.
- e) Visual Quality. The combination of development both within and outside the floodplain will contribute to the change in visual character of the East County region from primarily agricultural to a mix of suburban residential and agricultural. Pastoral visual qualities of the area would be diminished.
- f) Traffic and Circulation. Flooding impairs access, damages pavement, and creates maintenance problems. The regional drainage improvements would eliminate flooding as a potential problem.
- g) Public Utilities. Flooding can damage buried utilities and result in temporary loss of services. Drainage improvements, in conjunction with utilities, are preparatory to suburban residential and commercial development.
- h) Community Services. Flooding can affect emergency access, create a demand for emergency services, and contaminated waters on the floodplain can create health problems. The regional drainage improvements mitigate these problems, thereby making the floodplain more suitable for development.

#### G. EIR PREPARATION AGENCY

This EIR was prepared by DARWIN MYERS ASSOCIATES, under contract to Contra Costa County. Darwin Myers, Ph.D., had overall responsibility for project management and primary responsibility for preparing the planning analysis, and the geologic and hydrologic sections. Others who contributed

to the report included Paul Davis, staff planner, Steven D. Billington, planner; James A. Martin, biologist; and Miley Holman, archaeologist. Virginia Bacon had responsibility for report production.

#### H. INDIVIDUALS CONTACTED AND SELECTED REFERENCES

During the preparation of an Environmental Impact Report, written and oral communications take place between the consultant and various agencies and individuals. The following is a list of contacts and documents that were utilized.

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#### PERSONS CONSULTED DURING REPORT PREPARATION

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Mr. John Pinto	U.C. Riverside, Prof. of Entomology
Ms. Carrie Shaw	California Department of Fish & Game, Natural Diversity Data Base, Zoologist
Ms. Jeurel Singleton	U.S. Fish and Wildlife Service, Entomologist

#### AGENCIES CONTACTED (by Steven D. Billington)

State of California, California Regional Water Quality  
Control Board, Central Valley Region, March 1987,  
"Regional Mercury Assessment".

#### PERSONS CONTACTED (by Steven D. Billington)

Jim Blake	Contra Costa County Health Department Environmental Health
Sterling Davis	California Regional Water Quality Control Board, Central Valley Region
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John Nelson	California Department of Fish and Game Region II
Bob Todd	Park Ranger, Mt. Diablo State Park

**APPENDIX A**  
**INITIAL STUDY**

CONTRA COSTA COUNTY  
PUBLIC WORKS DEPARTMENT  
INITIAL STUDY  
OF ENVIRONMENTAL SIGNIFICANCE

Project Name: Marsh Creek Watershed Study

File # 4001-15

Public Works Department  
Administration Building  
Pine & Escobar Streets  
Martinez, California 94553

Prepared by: Paul M. Davis

Date: 11 January 1989

Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

---

RECOMMENDATIONS: ( ) General Rule: Exempt from Govt. Code 65402 by Board of Supervisors Resolution 81/522

( ) Categorical Exemption (Class ) ( ) Negative Declaration  
( x ) Environmental Impact Report Required ( ) Conditional Neg. Declaration

This Project (may) have a significant effect on the environment.

The recommendation is based on the following (List all items identified as significant):

What changes to the project would mitigate the identified impacts (List mitigation measures for any significant impacts and conditional negative declaration).

---

USGS Quad Sheet: Brentwood, Antioch South, Clayton, Diablo,  
Tassahara, and Byron Hot Springs

GENERAL CONSIDERATIONS:

1. Location:

See Page 2

2. Project Description:

See Page 2

3. Does it appear that any feature of the project will generate significant public concern?

☒ yes ☐ no ☐ maybe

(Nature of concern):

See Page 2

4. Will the project require approval of permits by other than a County agency? Agency name(s)

☒ yes ☐ no

See Page 3

5. Is the project within the Sphere of Influence of any city? (Name)

See Page 3

## GENERAL CONSIDERATIONS

1. Location: The Marsh Creek watershed is located in the eastern part of Contra Costa County north of the Alameda County line and west of the San Joaquin River. The upper end of the watershed is at the peak of Mt. Diablo, and the watershed boundary extends northeasterly and southeasterly from Mt. Diablo. Oakley lies just outside the watershed near the northernmost part of the watershed.

2. Project Description: The project consists of instituting a regional drainage plan for the Marsh Creek watershed and adopting a drainage fee ordinance to cover construction costs. The watershed will be divided into Drainage Areas 104 through 108 to facilitate construction of drainage systems within these areas at a later date. This drainage area would exclude all drainage areas already formed within the watershed. The regional drainage plan consists of a) constructing four (4) detention basins, b) modification to a segment of the channel, and c) improvements to the Marsh and Deer Creek dam sites. Figure 1 shows the location of project sites with respect to topographic and cultural features at a scale of 1"=2 mi. Figure 2 shows the location of proposed drainage improvements with respect to the channel of Marsh Creek and its major tributaries. The objective of the improvements is to enable Marsh Creek to carry peak discharge from the 100-year storm without overbank flooding.

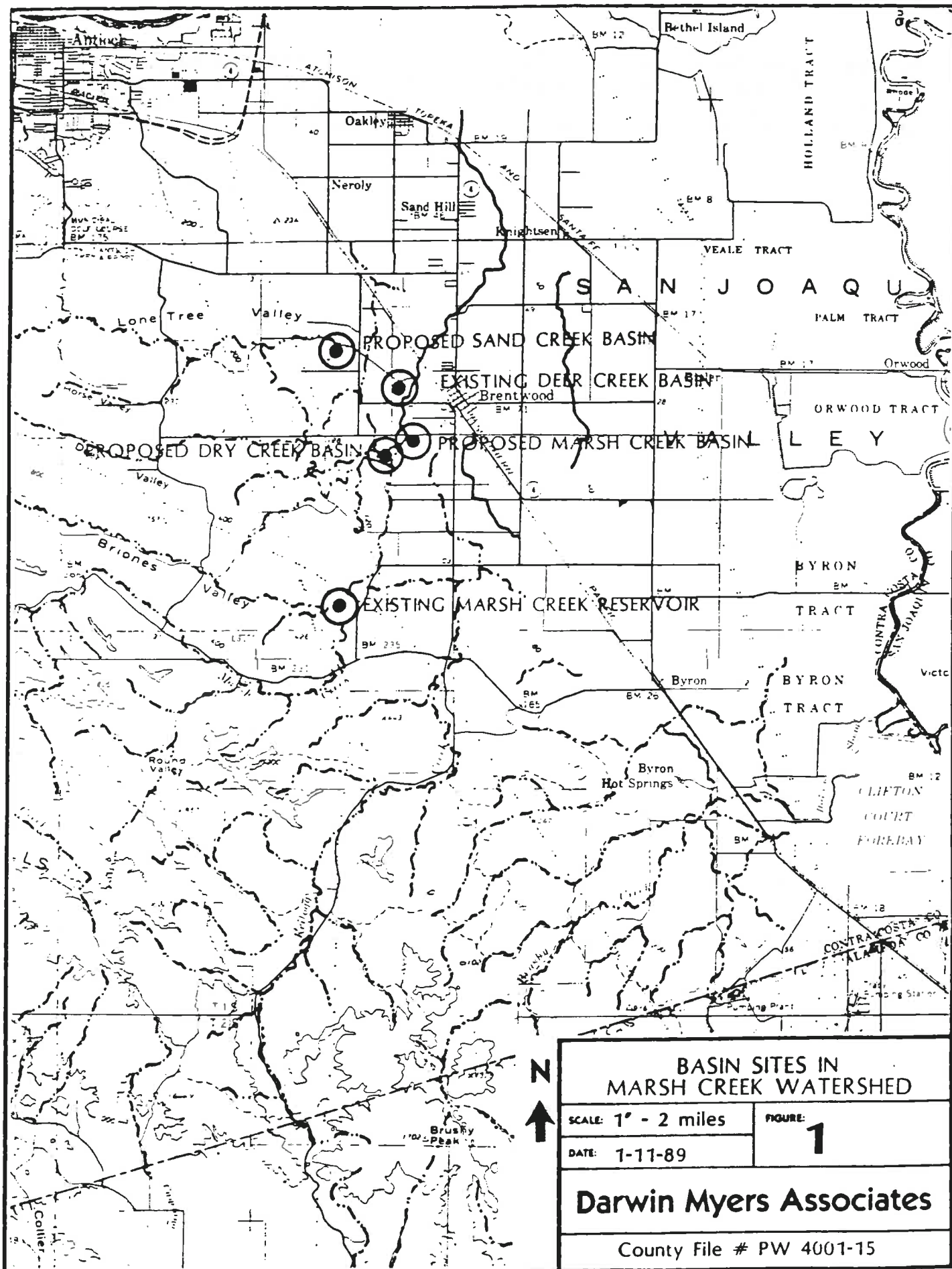
Modifications to Marsh Creek Reservoir include removal of the levee and moving Marsh Creek Road approximately to the 200' contour, as shown on the USGS topographic map of the area. Some excavation in the southern portion of the basin may also be required. Modifications to the Deer Creek Dam include some excavation/desilting. The proposed basins would be located on the southwest corner of Sand Creek Road and Fairview; at the meeting of Deer, Sand, and Marsh Creeks, on Dry Creek where it enters Marsh Creek and on Marsh Creek on the southeast side of Balfour Road. Modifications to Marsh Creek would be between the confluence of Sand and Dry Creeks.

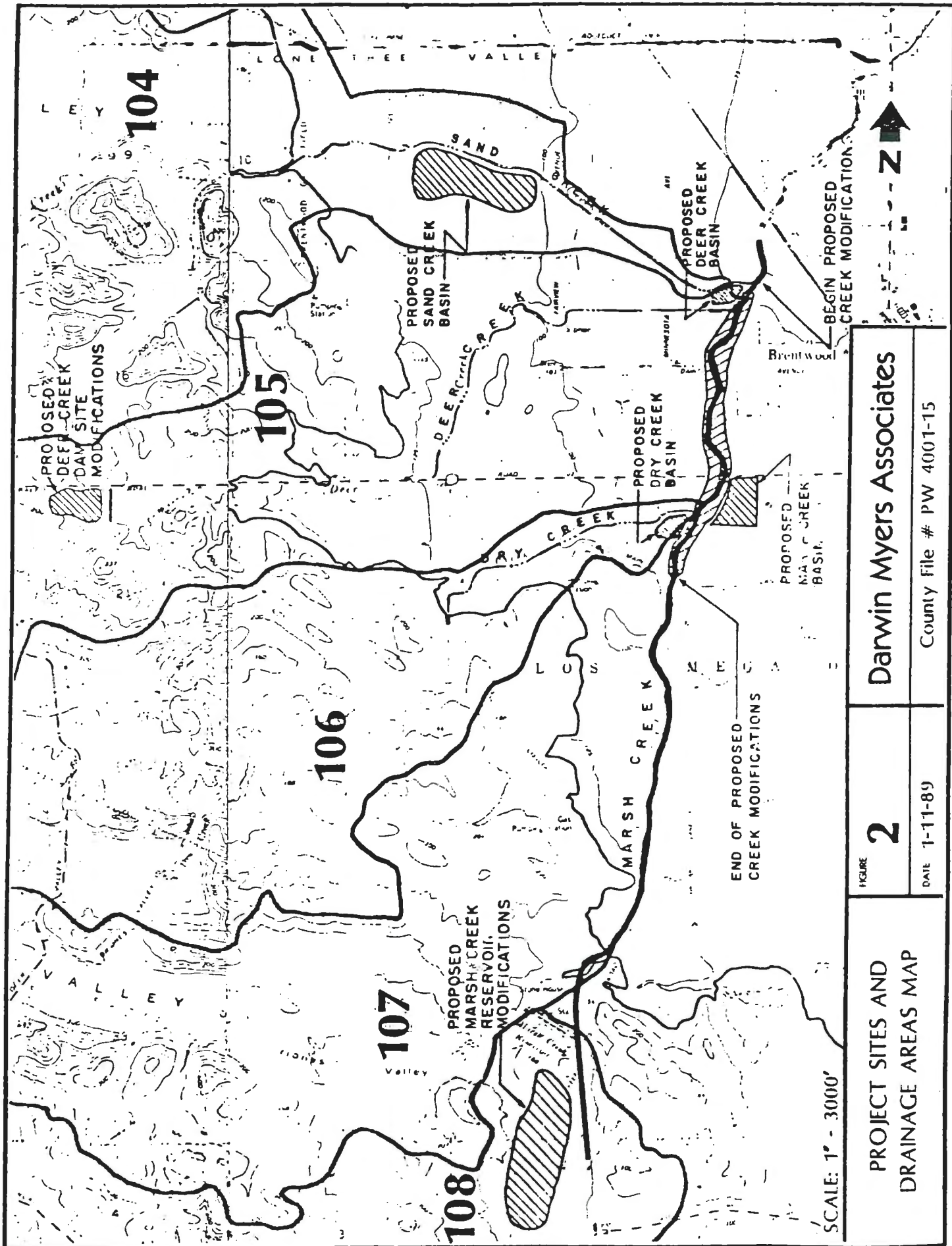
This initial study is intended to cover the regional drainage plan, the adoption of a drainage fee ordinance therefore, and the formation of Drainage Areas 104 through 108 within the Marsh Creek watershed. As Drainage Areas 104 through 108 develop in the future, requiring their own area-specific drainage plans, separate environmental impact assessments will be made for each area at that time.

3. Earth: (1a,1b); Water (3b,3c,3d,3i); Plant Life (4a); Animal Life (5a,5b); Land Use; Population; Housing; Public Services (14e); Human Health (17a, 17b); Aesthetics; Recreation; Cultural Resources (20a, 20b, 20c, 20d); and Mandatory Findings of Significance (21b, 21c).

4. Yes. The Department of Fish and Game (a streambed Alteration Permit), Corps of Engineers (404 Permit), Cities of Brentwood and Antioch (ordinance to collect fees from developers; approval of planned facilities in the City of Brentwood).

5. Brentwood and Antioch.





CONTRA COSTA COUNTY  
ENVIRONMENTAL CHECKLIST FORM

I. Background

1. Name of Proponent Contra Costa County Public Works Department
2. Address and Phone Number of Proponent Public Works Department  
255 Glacier Drive Martinez, CA. 94553  
Phone: (415) 646-4470
3. Date of Checklist Submitted 11 January 1989  
Marsh Creek Watershed Study
4. Name of Proposal, if applicable \_\_\_\_\_

II. Environmental Impacts

(Explanations of all significant, (S), answers are required on attached sheets.) \*\*

- |   | <u>*S</u> | <u>*I</u> |
|---|-----------|-----------|
| 1. Earth. Will the proposal result in:  |           |           |
| a. Unstable earth conditions or in changes in geologic substructures?   | <u>X</u>  | _____     |
| b. Disruptions, displacements, compaction or overcovering of the soil?  | <u>X</u>  | _____     |
| c. Change in topography or ground surface relief features?  | _____     | <u>X</u>  |
| d. The destruction, covering or modification of any unique geologic or physical features?   | _____     | <u>X</u>  |
| e. Any increase in wind or water erosion of soils, either on or off the site?   | _____     | <u>X</u>  |
| f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake? | _____     | <u>X</u>  |
| g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?   | _____     | <u>X</u>  |

\* Please note: 'S' is for significant; 'I' is for Insignificant.

\*\* Answers to the questions under Section II Environmental Impacts (1 through 21) are numbered to correspond to the questions.

2. Air. Will the proposal result in:

- a. Substantial air emissions or deterioration of ambient air quality?
- b. The creation of objectionable odors?
- c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?

— X

— X

— X

3. Water. Will the proposal result in:

- a. Changes in currents, or the course of direction of water movements, in either marine or fresh waters?
- b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?
- c. Alterations to the course or flow of flood waters?
- d. Change in the amount of surface water in any water body?
- e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?
- f. Alteration of the direction or rate of flow of ground waters?
- g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?
- h. Substantial reduction in the amount of water otherwise available for public water supplies?
- i. Exposure of people or property to water related hazards such as flooding or tidal waves?

— X

— X —

X —

X —

— X

— X

— X

— X

X —

4. Plant Life. Will the proposal result in:

- a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, and aquatic plants)?

X —

- |  |   |          |          |
|--|---|----------|----------|
| b.   | Reduction of the numbers of any unique, rare or endangered species of plants?   | —        | <u>X</u> |
| c.   | Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?  | —        | <u>X</u> |
| d.   | Reduction in acreage of any agricultural crop?  | —        | <u>X</u> |
| 5. Animal Life. Will the proposal result in:   |   |          |          |
| a.   | Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms or insects)?                    | <u>X</u> | —        |
| b.   | Reduction of the numbers of any unique, rare or endangered species of animals?  | <u>X</u> | —        |
| c.   | Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?  | —        | <u>X</u> |
| d.   | Deterioration to existing fish or wildlife habitat?   | —        | <u>X</u> |
| 6. Noise. Will the proposal result in:   |   |          |          |
| a.   | Increases in existing noise levels?   | —        | <u>X</u> |
| b.   | Exposure of people to severe noise levels?  | —        | <u>X</u> |
| 7. Light and Glare. Will the proposal produce new light or glare?  |   |          |          |
|  |   | —        | <u>X</u> |
| 8. Land Use. Will the proposal result in a substantial alteration of the present or planned land use of an area? |   |          |          |
|  |   | <u>X</u> | —        |
| 9. Natural Resources. Will the proposal result in:   |   |          |          |
| a.   | Increase in the rate of use of any natural resources?   | —        | <u>X</u> |
| 10. Risk of Upset. Will the proposal involve:  |   |          |          |
| a.   | A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions? | —        | <u>X</u> |

- |   |          |          |
|---|----------|----------|
| b. Possible interference with an emergency response plan or an emergency evacuation plan?   | —        | <u>X</u> |
| 11. Population. Will the proposal alter the location, distribution, density, or growth rate of the human population of an area?                         | <u>X</u> | —        |
| 12. Housing. Will the proposal affect existing housing, or create a demand for additional housing?  | <u>X</u> | —        |
| 13. Transportation/Circulation. Will the proposal result in:  |          |          |
| a. Generation of substantial additional vehicular movement?   | —        | <u>X</u> |
| b. Effects on existing parking facilities, or demand for new parking?   | —        | <u>X</u> |
| c. Substantial impact upon existing transportation systems?   | —        | <u>X</u> |
| d. Alterations to present patterns of circulation or movement of people and/or goods?   | —        | <u>X</u> |
| e. Alterations to waterborne, rail or air traffic?  | —        | <u>X</u> |
| f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?  | —        | <u>X</u> |
| 14. Public Services. Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas: |          |          |
| a. Fire protection?   | —        | <u>X</u> |
| b. Police protection?   | —        | <u>X</u> |
| c. Schools?   | —        | <u>X</u> |
| d. Parks or other recreational facilities?  | —        | <u>X</u> |
| e. Maintenance of public facilities, including roads?   | <u>X</u> | —        |
| f. Other governmental services?   | —        | <u>X</u> |
| 15. Energy. Will the proposal result in:  |          |          |
| a. Use of substantial amounts of fuel or energy?  | —        | <u>X</u> |

- b. Substantial increase in demand upon existing sources or energy, or require the development of new sources of energy?              X
16. Utilities. Will the proposal result in a need for new systems, or substantial alterations to the following utilities?              X
17. Human Health. Will the proposal result in:
- a. Creation of any health hazard or potential health hazard (excluding mental health)?       X
- b. Exposure of people to potential health hazards?       X
18. Aesthetics. Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view?       X
19. Recreation. Will the proposal result in an impact upon the quality or quantity of existing recreational opportunities?       X
20. Cultural Resources.
- a. Will the proposal result in the alteration of or the destruction of a prehistoric or historic archaeological site?       X
- b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?       X
- c. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?       X
- d. Will the proposal restrict existing religious or sacred uses within the potential impact area?       X
21. Mandatory Findings of Significance.
- a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate

important examples of the major periods of California history or prehistory?

\_\_\_\_\_ X \_\_\_\_\_

b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)

X \_\_\_\_\_

c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)

X \_\_\_\_\_

d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

\_\_\_\_\_ X \_\_\_\_\_

### III. Discussion of Environmental Evaluation

See Attachment.

### IV. Determination

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. ☐

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION WILL BE PREPARED. ☐

I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. X

Date \_\_\_\_\_

Signature \_\_\_\_\_

Reviewed By: \_\_\_\_\_

## SUPPLEMENT TO ENVIRONMENTAL CHECKLIST

### 1. Earth

- a. No geotechnical work has been done at any of the proposed sites. There is the possibility of bank erosion and/ or sedimentation problems. Also, the embankment slope gradients have not been determined as of this Initial Study.
- b. The project will involve excavation, and there is potential for bank erosion.
- c. The basins of the proposed project will blend with existing ground features.
- d. The overlays do not identify any unique geologic or physical features in the project area.
- e. The proposed detention basins will decrease soil erosion by water. Wind erosion on the basin will be prevented by revegetation.
- f. The basins would decrease siltation of the creeks. This effect would be beneficial.
- g. This is based on the assumption that embankments will be designed to perform satisfactorily under earthquake conditions.

### 2. Air

- a. There will be short-term emissions of particles from the construction equipment during grading.
- b. There will be no objectionable odors resulting from the proposed project.
- c. There will be no alteration of climate, air movement, moisture, or temperature due to the proposed project.

### 3. Water

- a. This project will not change the current, or the direction of water movement. The creation of the detention basins will only control the flow of storm waters to existing creeks.
- b. The purpose of the basins is to reduce peak flows, so the rate of runoff will be beneficially affected.

- c. The purpose of the project is to prevent overbank flooding and the resulting ponding of water on the floodplain area along Marsh Creek channel.
- d. The project will create basins, modify existing basins, and increase the cross-sectional area of a segment of the Marsh Creek channel.
- e. The discharge of water is not affected as far as quality is concerned.
- f. The basins would not affect ground water.
- g. The detention basin excavation would not extend into the ground water table, and ground water will not be withdrawn or added.
- h. This project would not affect the amount of water available for public use. Normal flows will continue downstream. The basin will capture only peak flood flows, and then release this water at a safer rate.
- i. The proposed project would reduce the risk of flooding/frequency of flooding on the existing creeks downstream from the basins. However, there is the possibility of drowning hazards in basins, depending on depth of water, embankment slope gradients, and duration of ponding.

#### 4. Plant Life

- a. There is the possibility of affecting some species, but there hasn't been a biologic assessment performed. These basins are located on agricultural or grazing land.
- b. An effect on sensitive species cannot be determined without a thorough biologic resources assessment.

A separate study has been performed on the existing Marsh Creek Reservoir, and is attached. This study lists seven (7) plant species with special status, and mitigation measures to minimize disturbances to them.

The proposed basin sites are presently used for grazing and agricultural crop production. The Deer Creek Dam site is dry for most of the year and is used for grazing. The modifications on Marsh Creek consist of excavating one bank to widen the creek. Excavation at these sites will disturb the animals living there, but the effects are temporary. The finished basin sites will, in fact, create secure animal habitats.

The modifications to the Marsh Creek Reservoir will be well above the standing water on the site. Riparian

habitat will be undisturbed. The modifications would include the possible removal or lowering of the levee and relocation of Marsh Creek Road to a higher elevation. All of the areas considered for these modifications are currently being used as grazing land only.

- c. The only possibility for introducing new species of plants into the area would be if the newly constructed basins were to be landscaped. However, in this case a landscape consultant would be hired to develop a planting scheme using native species.
- d. One of the proposed basins will partially occupy agricultural land. The amount is insignificant.

## 5. Animal Life

- a. There is literature from the Mt. Diablo Audubon Society & stating that there are rare species which occupy the
- b. habitat in the project area, but there hasn't been a biologic resources assessment to prove their statements.
- c. This project should have no effect on animals within the & area. However, a "Sensitive Taxa Assessment" report was
- d. developed to identify any animals existing within the area, which are recognized as "special" animals by the California Natural Diversity Data Base. This report included a list of mitigation measures to protect these "special" animals.

## 6. Noise

- a. The only noise generated from the project will be from & construction equipment, and all construction will take
- b. place during normal working day hours. There will be no ongoing noise generated after the project is completed.

## 7. Light and Glare

The project will not produce any new light, since there is no machinery or mechanical equipment associated with the basin.

## 8. Land Use

The proposal is for a drainage basin only, and the curtailed area could be subject to flooding. Also, the proposed project commits the basin sites to long-term use as drainage facilities. By reducing the frequency and extent of flooding along Marsh Creek, it could be viewed

as facilitating development.

9. Natural Resources

- a. The project does not require the use of any natural resources except for the use of fuel during construction. Once completed, the basins require no mechanical equipment to function.

10. Risk of Upset

- a. There is no risk of any hazardous substance being released, or an explosion. The only substance to be stored
- b. in the basins is water, on a short-term basis. No interference with an emergency evacuation will result from this project, assuming the emergency spillway will route runoff back into the channel, so no new areas would be subject to flooding as a result of the project.

11. Population

If the flood-prone area is reduced in size, it could facilitate development of the surrounding flood plain.

12. Housing

The improved channels and drainage patterns for the basin areas could affect housing development. The improvements in drainage may spark additional development. (The project will protect existing or future housing from possible flooding.)

13. Transportation/Circulation

The only effect on traffic will be short-term and will exist during construction of the basins. Once completed, the project will not generate traffic. Maintenance vehicles may enter the basins once a year.

14. Public Services

This project will not increase the need for fire or police protection; however, maintenance will be required. Maintenance efforts would occur once a year.

15. Energy

The only energy consumed will be the fuel used to run the construction equipment during grading.

16. Utilities

No utilities are required in conjunction with the proposed basins. All flows of storm waters are due to gravity.

17. Human Health

There is a strong possibility of mercury in the area, and the projects excavation could expose the mercury, resulting in a health hazard.

18. Aesthetics

Levees will be created adjacent to residential communities, and they may be considered offensive by some residents.

19. Recreation

The impact on recreation will be to increase potential recreation sites. Should the trend be toward dual use, the four (4) basins could be landscaped and used as parks as well as for flood control.

20. Cultural Resources

- a. The California Archaeological Inventory stated in a letter
- b. dated 4 March 1988, that, "Archaeological sites are typically
- c. found at foothill/valley interfaces, intermountain & valleys, and confluences of creeks and rivers". The
- d. project area has these types of sites, and there is high potential for prehistoric, cultural resources here. Also, there are two (2) historic structures which are identified on the project site.

21. Mandatory Findings of Significance

- b. To help in the stabilization of the levees and the basin & itself, specific vegetation should be planted around and
- c. on the levees. Mud holes in the basin should be planted with dewatering type vegetation to help reduce the water capacity in the basin.

**APPENDIX B**  
**ENGINEERS' REPORT**

**ENGINEER'S REPORT  
FOR  
THE FORMATION  
OF THE  
CONTRA COSTA COUNTY FLOOD CONTROL  
AND  
WATER CONSERVATION DISTRICT  
DRAINAGE AREAS 104 THROUGH 108**

**PREPARED BY THE STAFF  
OF THE  
CONTRA COSTA COUNTY FLOOD CONTROL  
AND  
WATER CONSERVATION DISTRICT  
255 GLACIER DRIVE  
MARTINEZ, CA 94553**

**JANUARY 1990**

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## I. RECOMMENDATION

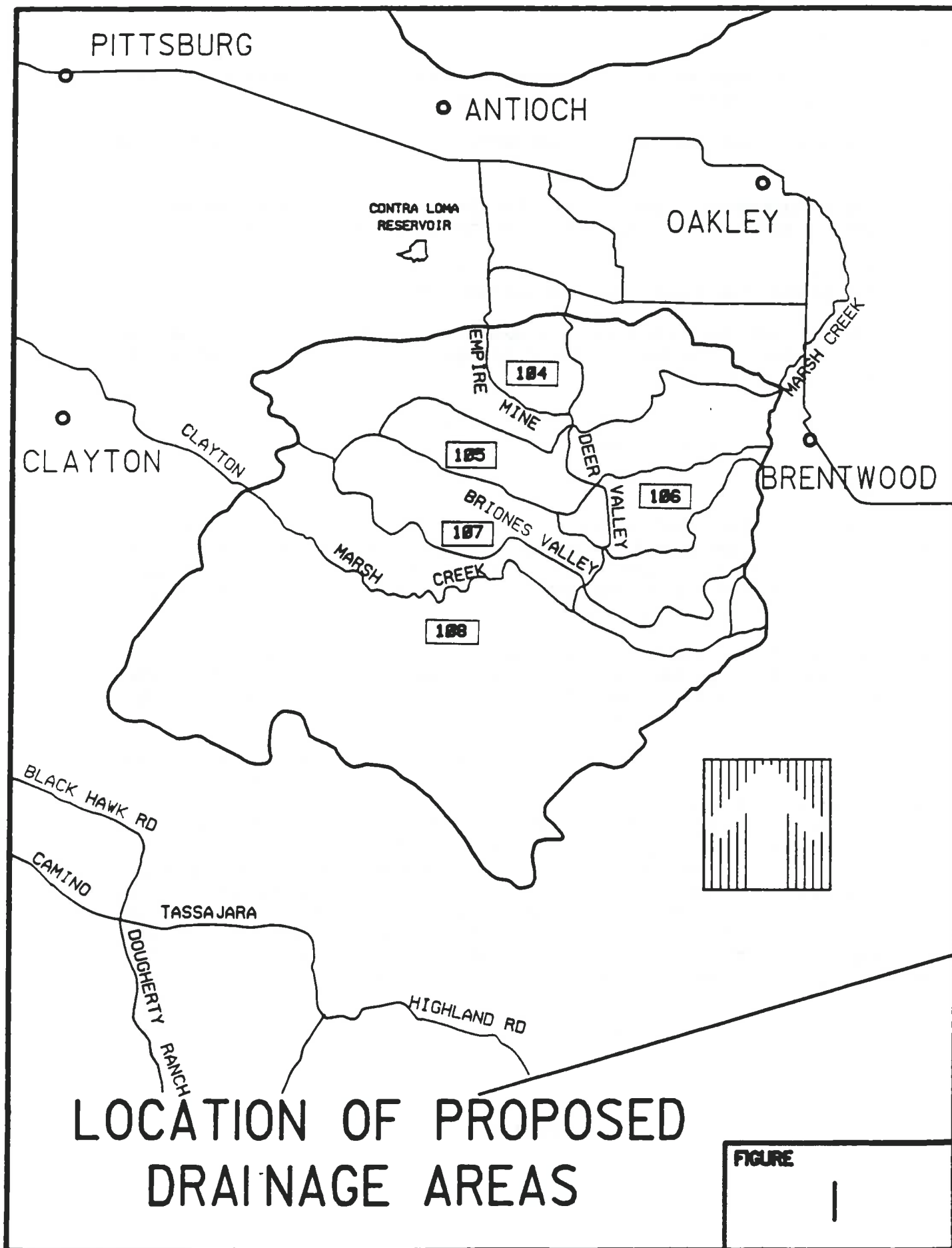
It is recommended that:

- A. The Marsh Creek Watershed Engineer's Report and the Regional Drainage Plan for the Marsh Creek Watershed be adopted.
- B. Drainage Areas 104 through 108 within the Marsh Creek Watershed be formed.
- C. The Environmental Impact Report for the Regional Drainage Plan and for the formation of Drainage Areas 104 through 108 be certified.
- D. A drainage fee ordinance based on impervious surfaces be adopted for the proposed Drainage Areas 104 through 108.
- E. The drainage fee ordinances for existing Drainage Areas 30B, 52A, and 52B be amended to include their appropriate share of the cost of the Regional Drainage Plan.
- F. Sub-Regional Drainage Plans be developed within the next twelve months for Drainage Areas 104 and 105.

## II. GENERAL

The Marsh Creek Watershed covers an area of approximately 52,500 acres (82 square miles). The main tributaries to Marsh Creek are Sand Creek, Deer Creek, Dry Creek, and Briones Creek. It is proposed to divide the Marsh Creek Watershed into five (5) parts in accordance with the approximate boundaries of its five (5) sub-watersheds (see Figure 1). These sub-watersheds are proposed to be formed into Drainage Area 104, with Sand Creek as its main watercourse; Drainage Area 105, with Deer Creek as its main watercourse; Drainage Area 106, with Dry Creek as its main watercourse; Drainage Area 107, with Briones Creek as its main watercourse; and Drainage Area 108, with upper Marsh Creek as its main watercourse.

These drainage areas, once formed, will provide the legal entity under which drainage fees can be collected to fund the regional drainage plan. The regional drainage improvements are designed to primarily prevent flooding on Marsh Creek. The proposed detention basins on Dry, Deer, and Sand Creeks will reduce peak flood flows downstream of the basins. Any drainage facilities required as part of development within the proposed drainage areas are considered specific for the development and thus are not part of the proposed regional drainage plan. It is anticipated that sub-regional plans will be developed and fee ordinances adopted for each Drainage Area. The sub-regional improvements and fees will be in addition to the regional improvements and fees proposed herein.



### III LOCATION

The Marsh Creek watershed is located in the easterly part of Contra Costa County north of the Alameda County line and west of the San Joaquin River. The upper end of the watershed is at the peak of Mount Diablo and the watershed boundary extends northeasterly and southeasterly from Mount Diablo. The Cities of Antioch and Brentwood are located along the watershed's northerly and easterly boundaries. Flood Control Drawings D-3034 and D-3035 show the watershed's exact location.

### IV. DESCRIPTION OF THE WATERSHED AND DRAINAGE AREAS

The Marsh Creek Watershed extends from the peak of Mount Diablo in a northeasterly direction into the San Joaquin River. The terrain changes from very steep at the mountain to flat near the river, with high to low rolling hills in between these areas. The watershed is being developed in the flat areas as the Cities of Antioch and Brentwood extend their boundaries into the watershed.

#### Drainage Area 104

Drainage Area 104 is located in the northerly portion of the Marsh Creek Watershed with Sand Creek as its principal watercourse draining toward Marsh Creek. The terrain in this area is mostly flat to low rolling hills. Existing land use is predominantly grazing and farming, with some high density single family residential in the easterly part of the area.

#### Drainage Area 105

Drainage Area 105 is located adjacent and to the south of Drainage Area 104. The principal watercourse draining the area toward Marsh Creek is Deer Creek. The terrain most suited to residential development is located in Deer Valley and the easterly part of the area. Present land use is grazing and agricultural, with some residential. Additional single family residential development is planned in the easterly portion of the drainage area.

#### Drainage Area 106

Drainage Area 106 is located adjacent and to the south of Drainage Area 105. The principal watercourse draining the area toward Marsh Creek is Dry Creek. This area is the smallest of all of the proposed drainage areas. Its westerly boundaries do not extend to Mount Diablo but end in the vicinity of Deer Valley Road. One third of the area consists of flat to rolling hills. Present land use is mostly grazing and some agriculture. Residential development is planned in the near future in the easterly part of the area.

### Drainage Area 107

Drainage Area 107 is located adjacent and to the south of Drainage Areas 105 and 106. The principal watercourse in the area is Briones Creek, which drains into the existing Marsh Creek Reservoir. Approximately one-third of the area consists of low to high rolling hills. Some flat areas exist in Briones Valley but the remaining area consists of steep hills. Present land use is grazing and some agriculture in the easterly part of the area.

### Drainage Area 108

Drainage Area 108 is located adjacent and to the south of Drainage Area 107. Its southerly boundary is common with the southerly boundary of the Marsh Creek Watershed. Drainage Area 108 is the largest of all the proposed drainage areas consisting mostly of steep hills. The principal watercourse draining the area is Marsh Creek. Present land use in the valley is farming, grazing, and some low density residential development.

## V. FLOODING IN THE WATERSHED AND EXISTING FLOOD CONTROL IMPROVEMENTS

The storms of 1952 and 1955 caused extensive agricultural flood damage in the flat portion of the watershed between the San Joaquin river and the Mt. Diablo foothills. To prevent a recurrence of such damage, the Department of Agriculture (Soil Conservation Service) and the Flood Control District adopted a plan for flood control improvements in the area. These improvements were designed to accommodate flood flows based on agricultural land uses and a 50-year design storm. The following improvements were completed in the 1960's and 1970's:

- A. Enlarging portions of Dry, Deer, and Sand Creeks, and Marsh Creek between the junction with Dry Creek and Big Break. Included in the above work were numerous culverts, road crossings, channel levees and maintenance access roads, and
- B. Construction of Flood Control Reservoirs on Marsh, Dry, and Deer Creeks including the necessary control structures.

Since agricultural activities are being diminished in favor of commercial and residential development, the existing flood control improvements are becoming less capable of carrying flood flows. It is important to understand that undeveloped or agricultural land allows rainfall infiltration and retention so that only a portion of the total rainfall reaches the creek or channel. Developed land, which creates hard surfaces, allows a much larger portion of the total rainfall to reach the creek or channel.

Also, as the watershed gradually converts from primarily agricultural uses to urban uses, the level of flood protection should be increased to protect against damages from a 100-year storm rather than a 50-year storm. This is consistent with the requirements of the federal flood insurance program and

local ordinances. During the winters of 1982 and 1986, storms of fairly long duration, but of moderate intensity, filled the existing reservoirs and channels and caused localized flooding.

In the face of continuing urbanization within the Marsh Creek Watershed the existing drainage facilities need to be modified and/or supplemented to accept higher runoff rates from urbanized uses and the 100-year storm.

#### VI. THE NEED FOR ADDITIONAL DRAINAGE IMPROVEMENTS

As discussed in Item V above, the observed high flood levels in the Marsh Creek Reservoir and Marsh Creek Channel indicate that flooding will occur along the creek for heavy rainstorms. The District has completed a hydrologic analysis of the watershed to determine discharge amounts at key points in the watershed. It was found that the capacity of Marsh Creek, at the junction with Dry, Deer, and Sand Creeks, is overtaxed by approximately 39 percent, 105 percent, and 68 percent, respectively. The discharges were calculated using a 100-year storm and land use as specified by the adopted current General Plans for the Cities of Antioch, Brentwood and the County (this 100-year storm will be hereinafter referred to as the design storm). The above percentages represent a potential for serious flooding. This situation would become worse if land uses ever exceed the land uses projected by the current general plans.

District staff recommends that a regional drainage plan be adopted. This plan would have to be acceptable to the Cities of Antioch, Brentwood and the County and would have to include provisions for mitigating public concerns. Failure to act now will limit our ability to implement environmentally sensitive solutions such as those proposed by this plan.

#### VII. DRAINAGE PLAN FORMULATION

##### A. APPROACH:

##### 1. What Type of Flood Control Facilities should be constructed?

The existing flood control improvements consist of channelization of approximately 8 miles of Marsh Creek between Big Break and the junction with Dry Creek and channelization of portions of Dry, Deer, and Sand Creeks to improve their flow capacity. These improvements also include flood control reservoirs on Marsh, Deer, and Dry Creeks which were intended to moderate flood flows so that the existing downstream creeks could remain as much as possible in their natural state. As mentioned before, this has worked well in the past where agricultural land uses allowed the rainfall to infiltrate the soil. However, as the land is converted into impervious surfaces, the rainfall has little chance to infiltrate and thus reaches the creeks very rapidly and undiminished, thereby causing creek overflows.

We recommend that the original flood control concept be retained and enlarged upon. Moderate the flood flows in Marsh Creek by means of flood flow detention basins on the creek's major tributaries and reconstruct the existing creek and channel system only where necessary.

## **2. Size of Drainage Facilities**

The proposed plan provides drainage facilities sized to accommodate the runoff produced by the impervious surfaces projected by the current General Plans. Additional impervious surfaces will only be created as a result of General Plan amendments. If this occurs then this proposed plan will have to be amended to accommodate the additional runoff. Any amendment to this drainage plan will require an environmental review in compliance with the California Environmental Quality Act.

If development, beyond that provided by the current General Plans, is allowed to take place there are several possibilities to control additional runoff. They are:

- a) Purchase additional right of way and enlarge the basins,
- b) modify the basins by steepening the side slopes and possibly lowering the bottom,
- c) modify the basins' inlet and outlet structures to by-pass initial flood flows, and
- d) construct additional basins.

## **3. Funding for the Proposed Drainage Plan**

A minimum of 85 percent of the proposed drainage facilities will be funded by the proposed drainage fees from new development. The remaining 15 percent will be funded from contributions for park lands, sale of possible excess right of way after project completion and/or an increase in drainage fees in the future. Construction of the drainage facilities will either be completed by the developer (giving credit against their fees for the work performed) or by public contract after a sufficient amount of fees have been collected. In either case, flood control facilities will be constructed only after the development has been approved by the County or the Cities.

## **B. THE RECOMMENDED PLAN**

### **1. General**

The recommended plan is based on a hydrological study of the area. The study, entitled "Marsh Creek Watershed Hydrology Report," examined storm water runoff in the Marsh Creek watershed for the design storm and its effects on the existing drainage system and the same system modified by possible channel widening and detention basins at various locations. By varying the location and size of these basins, the degree of necessary modifications on the existing creek and channel

system downstream of these basins can be determined. The selection process for the size and location of basins must consider the following factors:

- a. Depth/Volume relationship - Shallow basins are not cost effective since they require more land area.
- b. Position in the watershed - Location high in the watershed would be inefficient since a large portion of the watershed would not drain to it. Also, a location too low in the watershed would be inefficient since a minimum length of channel would receive reduced flow benefits or conversely, the costs of channel improvements required upstream of the basin would be high since the channel size required to convey the discharge from the larger portion of the watershed above the basin would be large.
- c. Ground slope - Steep existing ground slope from one end of the basin to the other increases the amount of excavation and right of way without any gain in storage capacity.
- d. Location within road system, other facilities and residential dwellings - Basins should not interfere with existing roads or transportation facilities planned for the future and should avoid existing residential dwellings.

In addition to the hydraulic considerations, the recommended plan must also consider environmental factors and public acceptance. The environmental impact report (of which this engineer's report is an appendix) explores the environmental impact of the plan.

## 2. Specifics

The District has investigated numerous alternatives of channel improvements and detention basins and is proposing the following system of improvements as the most effective and cost efficient (see Fig. 2 for location).

### Marsh Creek

The recommended drainage plan proposes that Marsh Creek remain as is between its outlet at Big Break and the junction at Sand Creek. The capacity of Marsh Creek downstream of the junction with Sand Creek is 2400 cfs including an allowance for freeboard. The combined runoff from the design storm is 3520. cfs. Therefore, the proposed plan calls for detention basins on Sand, Deer, and Dry Creek, as well as increasing the capacity of the existing Deer Creek Reservoir. These facilities will moderate the outflows from the respective watersheds so that the combined discharges do not exceed the capacity of the downstream channel.

The 7,000 linear feet of Marsh Creek between Sand and Dry Creeks were analyzed and the existing creek capacity was found to be approximately



1250 cfs between Sand and Deer Creeks and 1050 cfs between Deer and Dry Creeks. The discharges due to the design storm without upstream detention basins are 2570 cfs and 1920 cfs respectively. With the proposed detention basins in place the design storm flows are reduced to 1950 cfs and 1770 cfs respectively. Therefore, Marsh Creek needs to be widened between Sand and Dry Creeks to accommodate the reduced design storm flows.

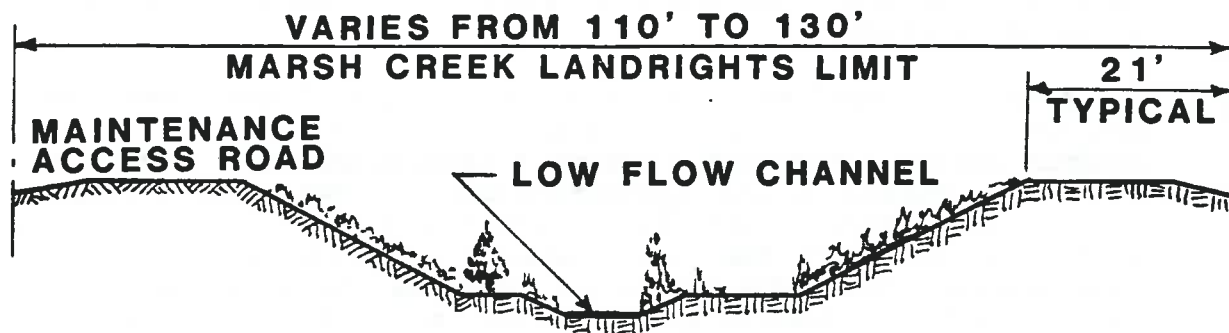
The proposed channel widening is shown on Figure 3 and shows both a minimum channel alternative and a modified channel alternative. The minimum channel alternative features a trapezoidal earth channel with a low flow channel at its approximate center. Two access roads, one on each side, provide maintenance access along the creek. Channel width and depth are the least possible to minimize right of way requirements. This size limitation restricts the amount of planting and channel-side vegetation in order to maintain channel flow capacity. The modified channel alternative features both maintenance access roads lowered toward the bottom of the creek. This increases the channel cross-sectional area and thus allows a higher level of riparian vegetation and, if desired, an access trail within the channel.

The reach of Marsh Creek located between Dry Creek and the Marsh Creek Reservoir is natural and heavily overgrown with bushes and trees. The capacity of the existing creek is unknown, but it is suspected that it is inadequate to carry the runoff for existing development conditions in various areas along its length. The current General Plan shows little to no development along the creek. If the current General Plan is changed to allow future development in the area, the creek could be preserved in its natural state by constructing levees to contain the increased creek flows. These levees should be set back 50 to 60 feet from the creek bank to provide a flood plain allowing creek meander and heavy riparian vegetation within its banks. The Regional Drainage Plan as proposed herein does not include such levees or any other flood control work along this reach of creek.

#### Dry Creek Basin

The proposed Dry Creek Basin is located on Dry Creek at the junction with Marsh Creek. The site is approximately four acres in size. The basin site is within Subdivision 6492 and is to be developed to perform as a flood detention basin and as a park (see Fig. 4).

The peak discharge on Dry Creek is approximately 230 cfs for the design storm. The basin will reduce this peak flow to 80 cfs. Maximum storage in the basin is approximately 24 acre-feet with two feet of freeboard. The basin would fill to this level during the design storm, but water depths would be less as a result of less severe storms. The basin would drain within 12 hours.



## MINIMUM CHANNEL REQUIRING LIMITS ON RIPARIAN VEGETATION

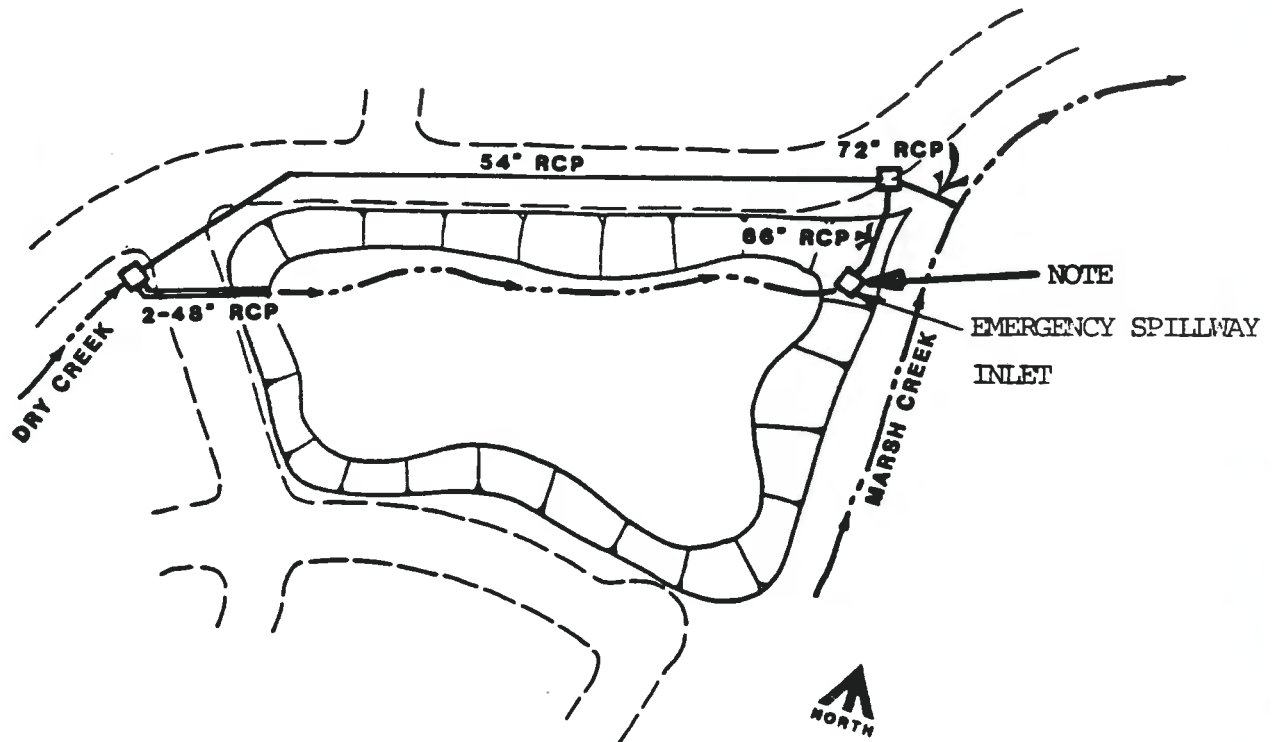


## MODIFIED CHANNEL ALLOWING ADDITIONAL RIPARIAN VEGETATION

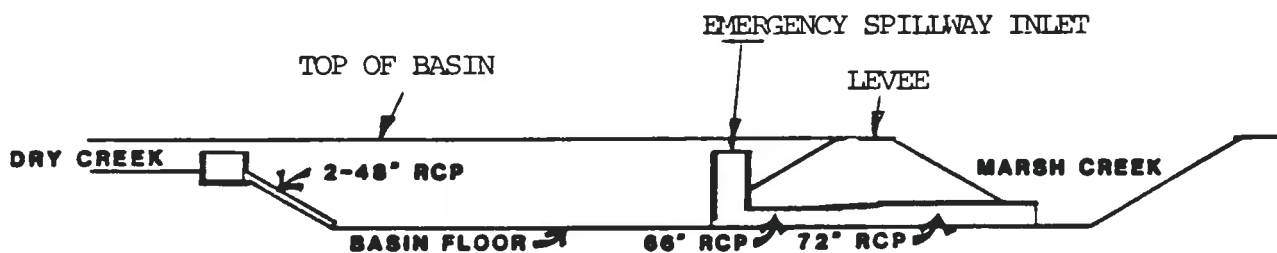
## PROPOSED MARSH CREEK WIDENING

FIGURE

3



## DRY CREEK BASIN

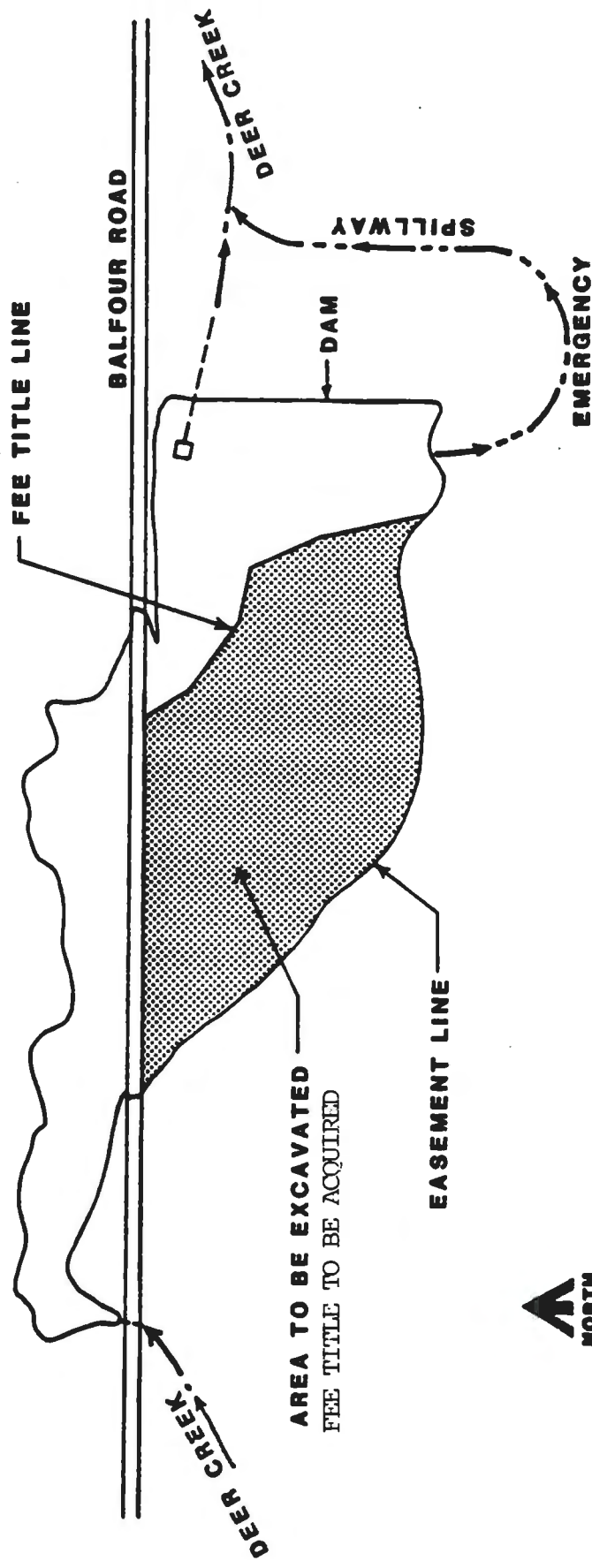


## CROSS SECTION

NOTE: EMERGENCY SPILLWAY STRUCTURE  
MAY BE REPLACED WITH SPILLWAY  
IN MARSH CREEK ACCESS ROAD.

FIGURE:

4



# DEER CREEK RESERVOIR

FIGURE:

5

### Deer Creek Reservoir

The existing Deer Creek Reservoir is located approximately three miles upstream of the Deer Creek junction with Marsh Creek. The size of this reservoir is such that it will discharge 100 cfs during the design storm. It is proposed to enlarge this reservoir so that 22 cfs outflow occurs during the design storm. This will require the conversion of existing Flood Control flowage easements into fee title land rights to allow for additional excavation. The existing reservoir control structures will not be affected (see Fig. 5).

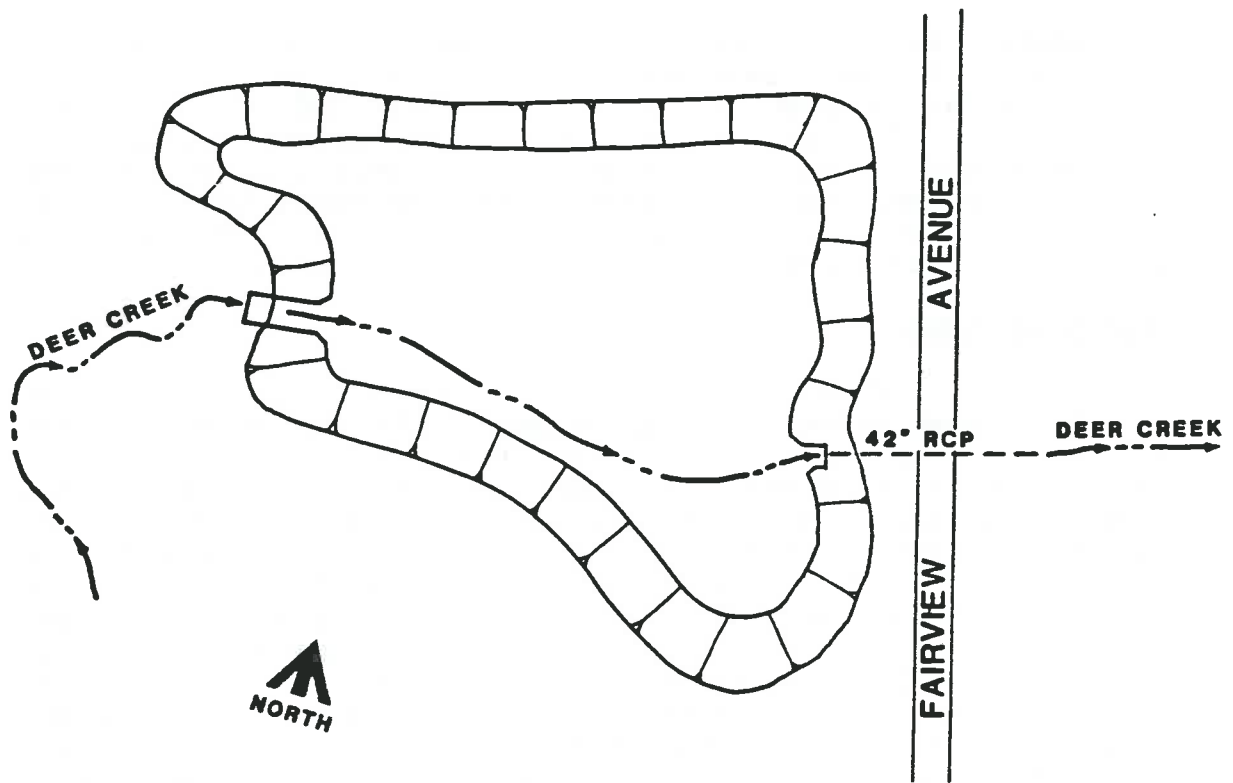
### Deer Creek Basin

The Deer Creek detention basin is proposed immediately to the west of Fairview Avenue on the Bloomfield property. At that point the creek follows a sharp oxbow as it passes under Fairview Avenue. The proposed basin would remove the oxbow and reduce substantially the size of the culvert that would be required at Fairview Avenue (see Fig. 6 for a configuration of the basin). Development plans for the area downstream of Fairview Avenue specify lowering Deer Creek by approximately five feet. The added depth would make the proposed Deer Creek Basin very efficient. The basin would occupy a surface area of approximately 12 acres and store 130 acre-feet with two feet of freeboard. The time needed to drain the basin is 12 to 24 hours for flows resulting from infrequent heavy rainstorms. The design storm discharge in Deer Creek is approximately 650 cfs. The basin would reduce this peak discharge to 85 cfs. This flow would increase to 190 cfs as it travels toward Marsh Creek as storm runoff from developments draining to the creek is added. The conditions for development downstream of the site envision a nature trail in and along the creek which makes the basin site a good location for a park. The proposed basin would also moderate the flows in Deer Creek so that a high level of vegetation can be maintained within the creek, making a nature trail even more attractive.

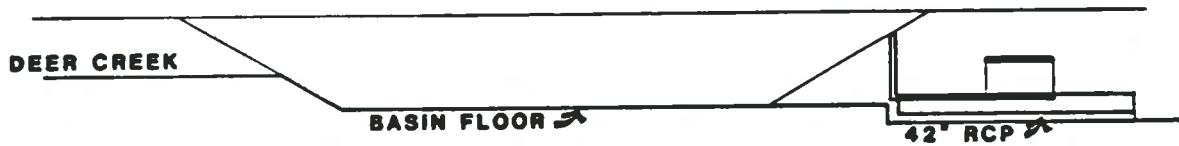
### Sand Creek Basin

The Sand Creek watershed is the most developable of all the sub-watersheds in the Marsh Creek area. Land use projected by the current General Plans is mainly residential over a large portion of the area. Our discharge projections for the design storm show Sand Creek discharges exceeding 2000 cfs. This heavy flow is not moderated by existing flood control reservoirs as on Marsh, Dry, and Deer Creeks. A large detention basin is therefore proposed. This basin would be located upstream of Fairview Avenue and affect the properties owned by Castello, Lea, Whitmer, Maggiora and Arione.

The proposed location is determined by the presence of two grade control structures in the channelized portion of Sand Creek. These structures make a deep basin possible resulting in considerable land savings. The basin location also considers the route of the future



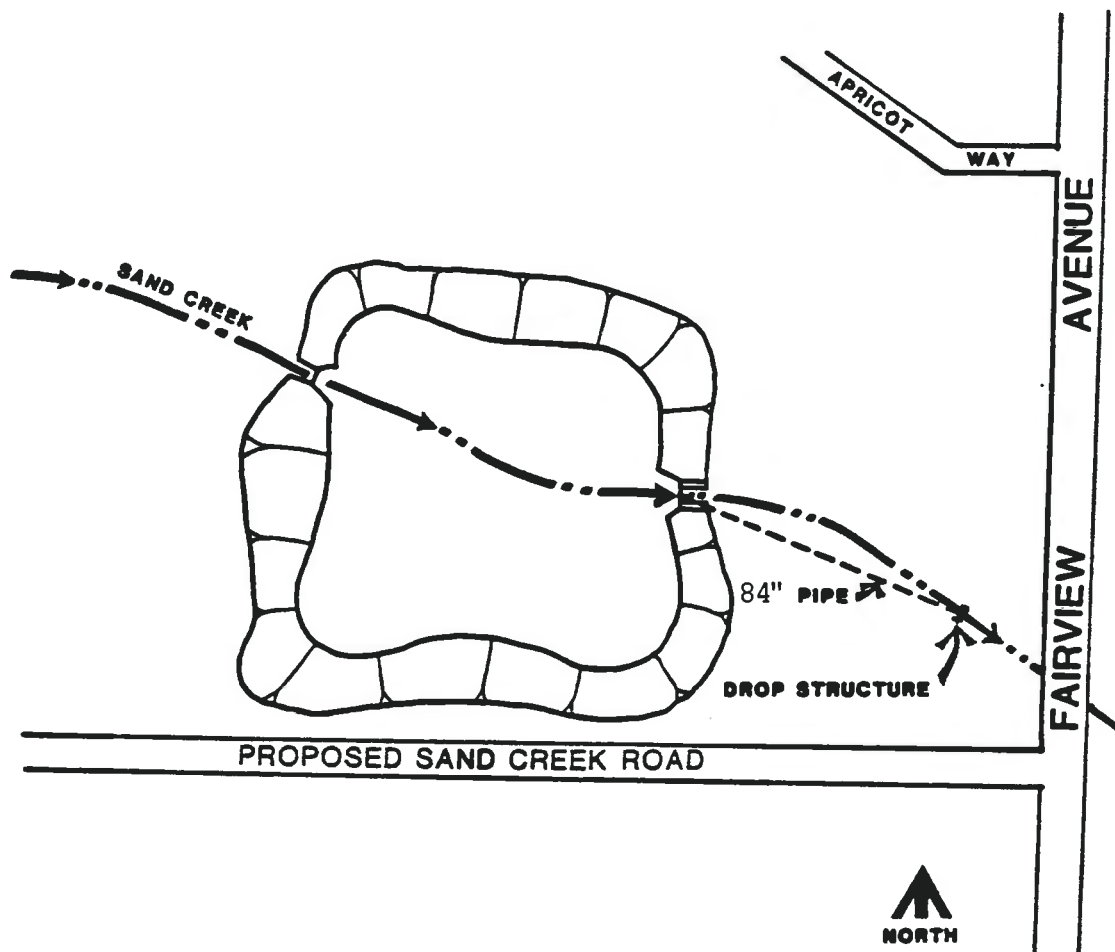
## PROPOSED DEER CREEK BASIN



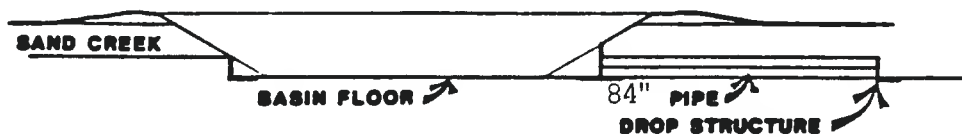
## CROSS SECTION

FIGURE:

6



## PROPOSED SAND CREEK BASIN



## CROSS SECTION

FIGURE:

7

Delta Expressway and realignment of Sand Creek Road in relation to the Expressway (see Fig. 7 for a configuration of the basin).

The proposed basin would require the purchase of approximately 90 acres of land. Sixty acres of this area would be occupied by the basin itself while the remaining area would be filled with the excavated basin material. The fill area would be contoured to blend with the basin excavation contours. The proposed detention basin would store in excess of 600 acre-feet of runoff with two feet of freeboard for the design storm. The basin would reduce flows in Sand Creek from 2010 cfs to 340 cfs. The basin would drain within two days. More moderate flows, such as those occurring once or twice a year, would fill the basin to a depth of two to four feet. This volume would drain within 12 hours.

The Sand Creek Basin would be ideally suited for multi-use because of its size. A park might be developed on two to three levels. The lowest level might be used for passive, nature study purposes, a higher level for picnicking on grassy areas, and a still higher level for active use such as a play field.

### 3. Cost Estimates

A cost estimate for the drainage plan has been prepared. The costs are based upon estimated 1992 values for land rights and 1995 values for capital improvements. The following is a summation of estimated costs (a detailed cost estimate is included as Exhibit "A"):

Drainage Facility	Construction	Utility Relocation	Land Rights	Engineering, Administration	Contingencies	Total Costs
Dry Creek Basin	\$ 300,000	None	\$220,000	\$ 78,000	\$ 58,000	\$ 656,000
Deer Creek Basin	830,000	None	726,000	234,000	176,000	1,966,000
Deer Creek Reservoir	130,000	None	282,000	62,000	46,000	520,000
Sand Creek Basin 9,754,000	2,714,000	35,000	4,950,000	1,175,000	880,000	9,754,000
Marsh Creek Modifications	<u>300,000</u>	<u>35,000</u>	<u>None</u>	<u>49,000</u>	<u>40,000</u>	<u>424,000</u>
TOTAL (rounded)	\$4,300,000	\$70,000	\$6,200,000	\$1,600,000	\$1,200,000	\$13,300,000

## VIII. DRAINAGE AREA FEES

It is proposed to form Drainage Areas 104 through 108 and adopt a regional drainage plan. It is further proposed that the plan's drainage facilities be funded by means of development fees collected in these drainage areas.

It is also proposed that existing drainage areas 30B, 52A, and 52B contribute towards the regional drainage plan since these areas discharge drainage directly into Marsh Creek without any flow moderation. This proposal will require an amendment (with public hearings) to the existing drainage fee ordinances for Drainage Areas 30B, 52A, and 52B and is a separate action from the drainage area formation discussed in this report.

The amount of the drainage fee charged each type of development is based on the cost of the drainage plan (\$13.3 million) divided by the total impervious surface created by new development (65 million square feet) equalling approximately \$0.20 per square foot.

A fee of \$0.17 per square foot of newly created impervious surface is recommended. The balance of \$2.3 million will be made up with contributions of funds for park purposes, possible disposal of surplus lands after basin construction and possible future increases in drainage fees and/or tax revenues in Flood Control Zone 1. As mentioned above, one of the two factors determining the amount of the drainage fee is "newly created impervious surface." The 65 million square feet of impervious surface used in the fee calculation was based upon development type and density of the current City and County General Plans. Drainage Areas 104 through 108 will yield 30 million square feet of impervious surface, and existing Drainage Areas 30B, 52A, and 52B will yield 35 million square feet of impervious surface.

Section 12 of the Contra Costa County Flood Control and Water Conservation District Act provides authority for the adoption and amendment of drainage ordinances and the collection of fees. These fees and the conditions for collection are set forth in the drainage fee ordinance attached as Exhibit "B". It is proposed that, as part of the formation of Drainage Areas 104 through 108, the draft drainage fee ordinance be adopted. It is also proposed to amend in a separate action the existing drainage fee ordinances for Drainage Areas 30B, 52A, and 52B to add the \$0.17 per square foot regional drainage fee to the existing fee.

Following the adoption of the regional drainage plan and its drainage fee ordinance by the cities and County, the District will prepare and present in a separate action a plan of subregional drainage improvements within Drainage Areas 104 through 108. The subregional drainage improvements are drainage facilities that are required to take care of the internal drainage needs within each drainage area. It is estimated that the additional fee for the subregional drainage plan would be approximately \$0.17 to \$0.20 per square foot of newly created impervious surface.

## IX. PROJECT IMPLEMENTATION

The implementation of the proposed drainage plan must be in step with the drainage needs of new development. It is difficult to predict when, where and to what extent new development will take place. However, the District proposes to implement the drainage plan in the order outlined below:

- |  |               |
|--|---------------|
| 1. Purchase of all necessary land rights | \$7.7 million |
| 2. Construction of the Sand Creek Basin  | \$3.5 million |
| 3. Construction of the Deer Creek Basin  | \$1.1 million |
| 4. Construction of the Dry Creek Basin   | \$0.4 million |
| 5. Widening of Marsh Creek               | \$0.4 million |
| 6. Modify the Deer Creek Reservoir       | \$0.2 million |

The plan features early acquisition of all necessary land rights in order to avoid escalated land values. The construction of the Sand Creek basin would follow next, since the Sand Creek watershed contributes such large amounts of drainage to Marsh Creek. The other facilities are approximately equal in importance. Implementation of these facilities will depend where new development is concentrated.

## X. MAINTENANCE OF THE COMPLETED FACILITIES

The responsibility for maintaining the completed facilities of the Regional Drainage Plan would be assumed by the existing Contra Costa County Flood Control District Zone 1 except for those facilities located at road crossings and where such facilities serve in a dual role such as flood control and park use. In these instances, the owners of the road will maintain any culverts and bridges located within the road right of way, and in the case of flood control basins doubling as parks, the special planting, lawns, picnic benches and so forth would be maintained by a City or County park district.

Maintenance activities include all work necessary to insure the drainage system's design capacity, appearance, and public safety.

The existing Contra Costa County Flood Control District Zone 1 will have to be amended to include the maintenance responsibilities for the facilities proposed by the Regional Drainage Plan.

UK:dmw  
UK:DA104.108RPT  
March 8, 1990  
revised:sj:fc/dmw

**"EXHIBIT "A"**

**CONTRA COSTA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT**

**DRAINAGE AREAS 104, 105, 106, 107 AND 108**

**REGIONAL DRAINAGE PLAN COST ESTIMATE (1995 PRICES)**

<u>Item No.</u>	<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Amount</u>	<u>Total</u>
<b><u>DRY CREEK BASIN</u></b>						
<b><u>CONSTRUCTION</u></b>						
1	Excavation	35,000	CY	2	70,000	
2	Erosion Control	4	AC	2,000	8,000	
3	Fencing (4' CL)	2,000	LF	10	20,000	
4	Special Planting including Irrigation	-	LS	20,000	20,000	
<b><u>PIPE SYSTEM</u></b>						
5	48" RCP	140	LF	120	16,800	
6	54" CP	650	LF	100	65,000	
7	66" RCP	65	LF	200	13,000	
8	72" RCP	40	LF	300	12,000	
<b><u>BASIN STRUCTURES</u></b>						
9	Control Weir	-	LS	15,000	15,000	
10	Emergency Spillway	-	LS	10,000	10,000	
11	Junction Structure	-	LS	7,000	7,000	
<b>Total Construction</b>						<b>\$ 257,000</b>
<b><u>UTILITY RELOCATIONS</u></b>						
<b>Total Utility Relocation</b>						<b>None</b>
<b><u>LAND RIGHTS</u></b>						
12	Basin Right-of-Way	4	AC	50,000	200,000	
<b>Total Land Rights</b>						<b>\$ 200,000</b>

<u>Item No.</u>	<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Amount</u>	<u>Total</u>
<b><u>DEER CREEK BASIN</u></b>						
<b><u>CONSTRUCTION</u></b>						
13	Excavation	215,000	CY	2	430,000	
14	Erosion Control	12	AC	2,000	24,000	
15	Fencing (4' CL)	3,000	LF	10	30,000	
16	Special Planting and Irrigation	-	LS	30,000	30,000	
<b><u>PIPE SYSTEM</u></b>						
17	24" CP	800	LF	35	28,000	
18	42" CP	940	LF	80	75,200	
19	54" RCP	120	LF	140	16,800	
<b><u>BASIN STRUCTURES</u></b>						
20	Inlet Structure	-	LS	30,000	30,000	
21	Control Weir	-	LS	25,000	25,000	
22	Outlet Structure	-	LS	15,000	15,000	
<b>Total Construction</b>						<b>\$ 704,000</b>
<b><u>UTILITY RELOCATIONS</u></b>						
<b>Total Utility Relocations</b>						<b>None</b>
<b><u>LAND RIGHTS</u></b>						
23	Basin Right of Way	12	AC	55,000	660,000	
<b>Total Land Rights</b>						<b>\$ 660,000</b>
<b><u>DEER CREEK RESERVOIR</u></b>						
<b><u>CONSTRUCTION</u></b>						
24	Excavation	50,000	CY	2	100,000	
25	Erosion Control	5	AC	2,000	10,000	
<b>Total Construction</b>						<b>\$ 110,000</b>
<b><u>UTILITY RELOCATIONS</u></b>						
<b>Total Utility Relocations</b>						<b>None</b>

<u>Item No.</u>	<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Amount</u>	<u>Total</u>
<u>LAND RIGHTS</u>						
26	Reservoir Right of Way	32	AC	8,000	256,000	
	<b>Total Land Rights</b>					<b>\$ 256,000</b>
<u>SAND CREEK BASIN</u>						
<u>CONSTRUCTION</u>						
27	Excavation	1,012,000	CY	1.50	1,518,000	
28	Erosion Control	60	AC	2000	120,000	
29	Fencing (4" CL)	5,200	LF	10	52,000	
30	Special Planting and Irrigation	-	LS	50,000	50,000	
<u>PIPE SYSTEM</u>						
31	24" CP	800	LF	50	40,000	
32	84" CP	2,000	LF	200	400,000	
<u>BASIN STRUCTURES</u>						
33	Inlet Structure	1	LS	50,000	50,000	
34	Basin Control Structure	1	LS	50,000	50,000	
35	Creek Outfall Structure	1	LS	20,000	20,000	
	<b>Total Construction</b>					<b>\$2,300,000</b>
<u>UTILITY RELOCATIONS</u>						
36	Gas, Water, Electric	-	LS	30,000	30,000	
	<b>Total Utility Relocations</b>					<b>\$ 30,000</b>
<u>LAND RIGHTS</u>						
37	Basin Right of Way	90	AC	50,000	4,500,000	
	<b>Total Land Rights</b>					<b>\$4,500,000</b>

<u>Item No.</u>	<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Amount</u>	<u>Total</u>
<b><u>MARSH CREEK WIDENING</u></b>						
<b><u>CONSTRUCTION</u></b>						
38	Excavation	46,000	CY	4	184,000	
39	Erosion Control	10	AC	2,000	20,000	
40	Structure Modifications	-	LS	50,000	50,000	
<b>Total Construction</b>						<b>\$ 254,000</b>
<b><u>UTILITY RELOCATIONS</u></b>						
41	Water, Gas	-	LS	30,000	30,000	
<b>Total Utility Relocations</b>						<b>30,000</b>
<b><u>LAND RIGHTS</u></b>						
42	Additional Channel Right of Way		Dedicated by Development			
<b>Total Land Rights</b>						<b>None</b>
<b><u>ALL CONSTRUCTION</u></b>						<b>\$3,625,000</b>
(add 18% to adjust prices for 1995)						<b>\$ 652,500</b>
<b>TOTAL (rounded)</b>						<b>\$4,300,000</b>
<b><u>ALL UTILITY RELOCATIONS</u></b>						<b>\$ 60,000</b>
(add 18% to adjust prices for 1995)						<b>\$ 11,000</b>
<b>TOTAL (rounded)</b>						<b>\$ 70,000</b>
<b><u>ALL LAND RIGHTS</u></b>						<b>\$5,616,000</b>
(add 10% to adjust prices for 1990/1992)						<b>\$ 562,000</b>
<b>TOTAL (rounded)</b>						<b>\$6,200,000</b>

<u>Item No.</u>	<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Amount</u>	<u>Total</u>
<b><u>ADMINISTRATION, ENGINEERING AND CONTINGENCIES</u></b>						
43	Cost Reimb. to Collect. Agency				70,000	
44	Misc. Develop. Costs, incl. Engineering				290,000	
45	Agency Inspection Fee				190,000	
46	Ordinance Administration				120,000	
47	District Cost for Coordination and Engineering Review				240,000	
48	District Cost for Zone Plan Changes and Ordinance Update				80,000	
49	Engineering & Administration Costs on Public Construction				300,000	
50	Right-of-Way Acquisition Labor and Legal Costs				200,000	
51	Utility Relocation Coordination and Engineering Costs				7,000	
52	Contingency				1,200,000	
53	Zone Plan Engineering				<u>75,000</u>	
<b>Total Administration, Engineering, &amp; Contingency</b>						<b>\$ 2,772,000</b>
<b><u>TOTAL REGIONAL DRAINAGE PLAN COST (Rounded)</u></b>						<b>\$13,300,000</b>

UK:pg/dmw  
 UK:da104.108  
 March 8, 1990

EXHIBIT "B"

ORDINANCE NO. 90/

AN ORDINANCE OF THE  
CONTRA COSTA COUNTY FLOOD CONTROL  
AND  
WATER CONSERVATION DISTRICT  
ESTABLISHING DRAINAGE FEES IN THE  
CONTRA COSTA COUNTY FLOOD CONTROL  
AND  
WATER CONSERVATION DISTRICT  
DRAINAGE AREA \_\_\_\_\_

The Board of Supervisors of Contra Costa County as the governing body of the Contra Costa County Flood Control and Water Conservation District does ordain as follows:

SECTION I. DRAINAGE PLAN. The drainage plan and map entitled "Drainage Area \_\_\_\_\_, Boundary Map and Drainage Plan", dated \_\_\_\_\_, on file with the Clerk of the Board of Supervisors, is adopted as the drainage plan for the Contra Costa County Flood Control and Water Conservation District Drainage Area \_\_\_\_\_ pursuant to Sections 12.2 and 12.3 of the Contra Costa County Flood Control and Water Conservation District Act (Chapter 63 of West's Appendix to the Water Code).

SECTION II. FINDINGS. This Board finds and determines that said drainage area has inadequate drainage facilities; that future subdivision and development of property within said drainage area will have a significant adverse impact on existing and future developments; that development of property within the drainage area, with its resultant increase in impervious surfaces, will require the construction of facilities described in the drainage plan; that the fees herein provided to be charged are uniformly applied on a square foot of impervious surface basis and fairly apportioned within said drainage area on the basis of benefits conferred on property upon which additional impervious surfaces in said drainage area are constructed; that the estimated total of all fees collectible hereunder does not exceed the estimated total costs of all drainage facilities shown on the drainage plan; and that the drainage facilities planned are in addition to existing drainage facilities already serving the drainage area at the time of the adoption of the drainage plan.

SECTION III. EXEMPTIONS. The fee shall not be required for the following: 1) To replace a structure destroyed or damaged by fire, flood, winds or other act of God, provided the resultant structure has the same, or less impervious surface as the original structure; 2) To modify structures or other impervious surfaces, provided the amount of ground coverage is not increased by more than 100 square feet; 3) To convey land to a government agency, public entity, public utility, or abutting property owner where a new building lot or site is not created as a result of the conveyance; or 4) Any lot or property for which drainage fees have been fully paid previously.

ORDINANCE NO. 90/

SECTION IV. FEE DEFERMENT. On lots greater than two acres in size, the property owner can defer the payment of the fee on the portion of the lot in excess of two acres that is not a required part of the pending development. The deferment of fee is conditional on the property owners granting, as collateral, the development rights to the Board of Supervisors for said area of deferred fee until such time as the fee is paid.

SECTION V. BUILDING PERMITS. Except as permitted under Section III and IV, the Contra Costa County or the city official having jurisdiction shall not issue any building permit for construction within the drainage area until the required drainage fee has been paid. For initial construction the fee shall be as set forth in Section VII. For single family residential swimming pools on lots for which the drainage fee has not been paid, the fee shall be \$145 per pool. For other construction, modifications or replacements to an existing facility that cause an increase in impervious surface, including but not limited to driveways, walks, patios etc., the amount of net increase in impervious surface shall be subject to a fee of \$\_\_\_\_ per square foot, but not to exceed the amount required under Section VII.

SECTION VI. SUBDIVISIONS. Except as permitted under Sections III and IV, the subdivider shall pay the drainage fee on the entire proposed subdivision or on each individual unit for which a final or parcel map is filed prior to recordation of said map. Town house, condominium, and cluster housing type subdivisions creating individual lots less than 4,000 square feet shall be treated as multifamily residential and the lot size used in determining the "square feet of land per unit" shall be the lot size prior to subdividing. Except as noted above, the fee for all other subdivisions shall be calculated on an individual lot basis. The fee amount shall be as set forth in Section VII.

SECTION VII. FEE SCHEDULE  
Commercial/Industrial/Downtown Office  
Office (Medium):  
Office (Light):

Building Permit  
 \$6990/acre  
 5990/acre  
 5015/acre

Subdivision  
 \$7510/acre  
 6695/acre  
 5650/acre

Multifamily Residential (Including Mobile

Home Parks):

Less than 2,500 sq. ft. of land per unit		5510/acre	5510/acre
2,500 to 2,999	" "	325/unit	325/unit
3,000 to 3,999	" "	375 "	375 "
4,000 to 4,999	" "	435 "	435 "
5,000 to 5,999	" "	500 "	500 "
6,000 to 6,999	" "	560 "	560 "
7,000 to 7,999	" "	620 "	620 "
8,000 +	" "	650 "	650 "

Single Family Residential:

4,000 to 4,999 sq. ft. of land per unit	\$ 455/unit	\$ 735/unit
5,000 to 5,999       "       "	480 "	765 "
6,000 to 6,999       "       "	500 "	795 "
7,000 to 7,999       "       "	520 "	825 "
8,000 to 9,999       "       "	550 "	870 "
10,000 to 13,999       "       "	610 "	955 "
14,000 to 19,999       "       "	710 "	1100 "
20,000 to 29,999       "       "	880 "	1320 "
30,000 to 39,999       "       "	1095 "	1580 "
40,000 +               "       "	1310 "	1815 "

Agricultural:

Under 10% of lot impervious	Exempt
More than 10% of lot impervious	6665/acre of developed portion

On single family lots, barns and sheds in excess of 400 square feet and tennis and sports courts shall not be considered as incidental residential facilities included in the above fee schedule. The drainage fee for the portion of these facilities in excess of 400 square feet shall be calculated using the square foot fee in Section V, and it shall be in addition to the above fee amounts.

For the purpose of this ordinance, subject to Section VI, lot size shall be: (1) for existing lots, that land shown on the latest equalized assessment roll as a lot; or (2) for new subdivision lots, that land shown on the final or parcel map as a lot. The fee amounts under "Single Family Residential" shall apply to lots containing only one dwelling unit. For multifamily residential (including mobile home parks) the "square feet of land per unit" shall be the quotient obtained by dividing the lot size in square feet by the number of dwelling units proposed to be on the lot.

SECTION VIII. FEE PAYMENT. The official having jurisdiction may accept cash or check, or, when authorized by the District's Chief Engineer, other consideration such as actual construction of a part of the planned drainage facilities by the applicant or his principal. All fees collected hereunder shall be paid into the County Treasury to the account of the drainage facilities fund established for the drainage area. Monies in said fund shall be expended solely for land acquisition, construction, engineering, administration, repair, maintenance and operation, or reimbursement for the same, in whole or in part, of planned drainage facilities within the drainage area or to reduce the principal or interest of any bonded indebtedness of the drainage area.

SECTION IX: CREDIT. Drainage fees previously paid shall be credited as follows:

- a) Where drainage fees have been partially paid under a former Ordinance, fees shall not be required for any part of the total area for which the fee was paid.

- b) Where drainage fees have been paid other than pursuant to an adopted drainage fee ordinance, credit shall be given for the dollar amount of the fee paid for the development site.
- c) Where drainage fees have been paid pursuant to this ordinance or other ordinance based on impervious surface, the credit shall be based on the ordinance in effect at the time of the additional payment.

SECTION X. EFFECTIVE DATE. This ordinance becomes effective 60 days after passage, and within 15 days of passage shall be published once with the names of supervisors voting for and against it in the Brentwood News, a newspaper published in this county.

PASSED AND ADOPTED ON \_\_\_\_\_, by the following vote:

AYES:

NOES:

ABSENT:

\_\_\_\_\_  
Chairman of the Board

ATTEST: PHIL BATCHELOR, Clerk of the  
Board of Supervisors and  
County Administrator

By \_\_\_\_\_  
Deputy

SK:lv/dmw  
sk:DA104.108ord

# California Environmental Quality Act

## NOTICE OF

☒

Completion of Environmental Impact Report

☐

Negative Declaration of Environmental Significance

CONTRA COSTA COUNTY COMMUNITY DEVELOPMENT DEPARTMENT  
651 PINE STREET NORTH WING-4TH FLOOR MARTINEZ, CALIFORNIA 94553-0095

Telephone: (415) 646-2091

Contact Person Gus Almquist

### Project Description and Location:

MARSH CREEK WATERSHED STUDY, FORMATION OF DRAINAGE AREAS 104-108, County File #CP 88-69: The project consists of instituting a regional drainage plan for the Marsh Creek Watershed, located in the Brentwood area. The Watershed will be divided into Drainage Areas 104 through 108, and a drainage fee ordinance adopted. The drainage plan consists of constructing 3 detention basins, modifying Marsh Creek, and increasing the capacity of the existing Deer Creek Reservoir.


The Environmental Impact Report or Justification for Negative Declaration is available for review at the address below:

Contra Costa County Community Development Department  
4th Floor, North Wing, Administration Building  
651 Pine Street  
Martinez, California

Review Period for Environmental Impact Report or Negative Declaration: March 26, 1990  
thru May 10, 1990

AP 9 R 12/89

By

  
Community Development Department Representative